VOLUME 23 NUMBER 4 DECEMBER 1960

SOCIOMETRY

A JOURNAL OF RESEARCH
IN SOCIAL PSYCHOLOGY

Articles by

CARLSON
STAATS, STAATS and HEARD
VIDEBECK
MacRAE
KOHN and CARROLL
HUTCHINS and FIEDLER
DAVIES
MANHEIM

Published by

THE AMERICAN SOCIOLOGICAL ASSOCIATION

SOCIOMETRY

EDITOR

JOHN A. CLAUSEN

ASSOCIATE EDITORS

EDGAR F. BORGATTA
ORVILLE G. BRIM, JR.
LAUNOR F. CARTER
NATHANIEL L. GAGE
ERVING GOFFMAN
SIDNEY SIEGEL
SHIRLEY A. STAR
HERBERT A. SIMON
FRED L. STRODTBECK
GUY E. SWANSON

EDITORIAL CONSULTANTS

WENDELL BELL
PETER M. BLAU
ROGER W. BROWN
JAMES S. COLEMAN
LEONARD S. COTTRELL, JR.
SANFORD M. DORNBUSCH
FRED E. FIEDLER
ALLAN R. HOLMBERG
ALEX INKELES
HERBERT C. KELMAN
MELVIN L. KOHN
WILLIAM W. LAMBERT
DUNCAN MACRAE, JR.
JAMES G. MARCH
FREDERIC MOSTELLER
ROBERT RADLOW
THEODORE R. SARBIN
STANLEY SCHACHTER
WILLIAM A. SCOTT
JOHN THIBAUT
RALPH H. TURNER
EUGENE A. WEINSTEIN
ROBERT F. WINCH
MARION RADKE YARROW

EXECUTIVE OFFICER

ROBERT BIERSTEDT

Published four times a year

March, June, September, December

by

THE AMERICAN SOCIOLOGICAL ASSOCIATION

at The Boyd Printing Co., Inc., 49 Sheridan Ave., Albany 10, N. Y.

Sociometry was founded in 1937 by J. L. Moreno

Communications for the Editors and all manuscripts should be addressed to John A. Clausen, Institute of Human Development, Institute Annex, 2251 College Avenue, Berkeley 4, California. Business communications should be addressed to Robert Bierstedt, The American Sociological Association, New York University, Washington Square, New York 3, New York.

Copyright © 1960 by THE AMERICAN SOCIOLOGICAL ASSOCIATION

Second class postage paid at Albany, N. Y.

SOCIOMETRY

A JOURNAL OF RESEARCH IN SOCIAL PSYCHOLOGY

VOLUME 23 · NUMBER 4 · DECEMBER 1960

CONTENTS

Clique Structure and Member Satisfaction in Groups. . *Earl R. Carlson* 327

Attitude Development and Ratio of Reinforcement
Carolyn K. Staats, Arthur W. Staats and William G. Heard 338

Self-Conception and the Reactions of Others. . . . . *Richard Videbeck* 351

Direct Factor Analysis of Sociometric Data. . . . . *Duncan MacRae, Jr.* 360

Social Class and the Allocation of Parental Responsibilities
Melvin L. Kohn and Eleanor E. Carroll 372

Task-Oriented and Quasi-Therapeutic Role Functions of the Leader in Small Military Groups. . . . . *Edwin B. Hutchins and Fred E. Fiedler* 393

The Measurement of Disproportionality. . . . . *Vernon Davies* 407

Intergroup Interaction as Related to Status and Leadership Differences Between Groups. . . . . *Henry L. Manheim* 415

SOCIOMETRY

EDITORIAL POLICY

Sociometry is concerned with the entire range of interests and problems represented by research in social psychology. It is the policy of the editors to seek those manuscripts for publication which represent the significant research interests of investigators who are concerned with giving the field of social psychology theoretical structure and reporting research which is clearly focused, well designed, and competently conducted.

While social psychology is presently regarded by most as a field with indeterminate boundaries, it has as its central focus the investigation of the processes and products of social interaction at the interpersonal, intrapersonal, intergroup, and intragroup levels and the development of significant generalizations therefrom. In keeping with the more general meaning of the name of the journal emphasis will be placed on measurement of social behavior. However, this emphasis does not exclude the acceptability of good articles which must rely upon qualitative materials and analyses.

The editors and editorial consultants can be expected to subject manuscripts to rigorous criticism and screening according to the best standards of scientific research and at the same time avoid a sterile orthodoxy which would stultify the communication of creative ideas at the growing edge of the science. Thus the journal will strive to be flexible in its response to the publication needs of its contributors.

It is the intention of the editors to avoid any tendency toward professional provincialism and to invite contributions from any sector of the scientific community which promise to further the objectives of the journal.

Annual *subscription* rate $9.00; special rate to members of The American Sociological Association $4.50. Single issues $2.50.

Specifications for Manuscript Preparation for Sociometry may be obtained from the Editorial Office.

Back Issues dated 1937 through 1955 should be ordered from the former publisher, Beacon House, Beacon, New York.

Notice of *change of subscriber's address* should be sent to The Association four weeks in advance, indicating the old as well as the new address.

Clique Structure and Member Satisfaction in Groups [1]

EARL R. CARLSON
Michigan State University

The influence of group structure on member satisfaction and productivity has been documented in numerous studies in recent years. Group cohesiveness, or the attractiveness of the group, has been found an important determinant of member satisfaction in conference groups (12), team effectiveness of aircraft crews (13), and productivity in industrial work groups (14). Mutuality of choice between particular members of a group has been shown to contribute to crew effectiveness (4), and high sociometric choice of group leaders was found in several studies to affect group performance (13).

The extent to which a group is organized into subgroups, or cliques, has also been suggested as an important factor in the functioning of the group (2, 11, 15, 16). Considerable interest has been given to the mathematical determination of cliques from sociometric data (6), but there has been little direct empirical research to show the importance of clique structure to the operation of the group as a whole.

In any group of three or more members, subgroups may form. Such interaction systems may be carried over to the group situation from previously established relationships, or they may form when the group as a whole fails to satisfy the goals of members and members turn to other relationships which will serve these needs.

The presence of cliques does not in itself necessarily produce disintegration in groups. Stogdill suggests that group integration will be "high when the subgroups are well integrated, when their norms support the structure and objectives of the larger group, and when the activities of the subgroups are well coordinated in relation to the group objectives." Subgroups may, in fact, contribute positively to maintenance of the group as a whole, in that they "provide escape from unpleasant organizational pressures, strengthen the confirmation of value systems, and often reinforce the identification of members with the larger groups" (15).

When subgroups differ in basic goals or in their "perceptions of reality," however, the likelihood of intragroup conflict increases. In a systematic discussion of conditions for conflict, March and Simon indicate that in groups where there is a "positive felt need for joint decision-making," intragroup

[1] This study was conducted with the cooperation of the Conference Research Project at the University of Michigan. The author is indebted particularly to Dr. Roger W. Heyns for his advice and assistance through the course of the study.

conflict is fostered by (a) differences in goals or interpretation of goals, and (b) differences in perceptions or interpretations of events involved in group interactions (11).

The present study is concerned with the satisfaction of members with the process and decisions of a specific group meeting. Clique structure could have an impact on this satisfaction in several ways. First, differences in goals or perceptions underlying the clique organization itself could directly affect the consensus or disagreement with specific outcomes of a meeting. In this case, when members' goals and perception differ significantly between cliques, these differences will tend to show up in disagreement and dissatisfaction with aspects of a specific meeting, independent of the interactions taking place within that meeting.

On the other hand, conflicts of interests and views may be manifested in the process of a meeting. French's study comparing the effectiveness of organized and unorganized groups showed that cleavage into opposing factions was largely responsible for the failure of the unorganized groups to meet problems effectively (5). In the organized groups frustration led to aggression and open hostility, but the groups remained relatively interdependent in feeling and in efforts to meet the tasks. Less organized groups reacted to frustration by splitting into subgroups which were unable to work effectively together toward a common solution.

When a group is subdivided into an organization with an unclear role structure which provides uncertain expectations and demands, integration can also be expected to suffer. Clique structure, of an informal and often implicit, rather than well-defined, nature, will likely contribute to uncertain expectations within the group. On this point Stogdill argues that "role confusion and role conflict reduce a member's ability to act decisively and reduce his satisfaction with the organization" (15). In turn, the conflict and lowered satisfaction reduce a member's contribution to the group as a whole.

A further role of strong interpersonal relationships in group functioning is suggested by Thibaut and Kelley, who point out that friendships heighten expectations of support from one's subgroup (16). When members holding divergent opinions have little support from other members, they are subject to strong pressures to conform to the group's norms and decisions. When members expect support from others, however, resistance to change is increased, and conflict is lengthened.

Several sources, then, suggest the basic hypothesis of the present study, that the extent of clique structure will be negatively related to satisfaction of members with a group meeting. To test this hypothesis, a study is made from data collected in a field study of 68 conference groups. There are two primary objectives. First, several alternative measures of the extent of clique

structure in the group are interrelated to determine whether a common "cliqueness" factor is present in each. Second, to clarify the contribution of the clique structure to the functioning of the group, each measure of clique structure is related to satisfaction of the members with the group.

METHOD

The data for the present study come from a field observation of conferences in government and industry conducted by the Conference Research Project at the University of Michigan (12). The original field project studied 72 decision-making conferences of management personnel in industrial, business and federal and local governmental organizations. In most cases the members were of high status in the organization, and had worked together for a period of time before the meetings included in the study. The groups ranged in size from five to 15 members, with a mean of nine members, and conferences were from 16 minutes to approximately three hours in duration.

The data were collected in four stages. Leaders of the groups were interviewed immediately prior to each conference, answering a limited number of questions. Three trained observers coded all interactions in each meeting, and immediately after the conference made a series of ratings covering various aspects of the meeting. All participants answered a questionnaire immediately after the conference, and at this time ratings were given to assess the members' perceptions of the interaction process. Finally, all participants were interviewed within 48 hours after the conference.

Measure of Clique Structure

Three sets of data provided measures of clique structure. First, the leaders of the conferences were asked direct questions before each conference about the structure of the group. Second, the observers identified cliques in ratings given after the conferences. Third, all members of each group rated all other members as to the importance of the role each had played in the meeting. Four specific indices were derived from the observer ratings, three from the leader ratings, and two from the matrix of interpersonal ratings of members.

1. *Observer Ratings.* A manual described in specific terms the cues observers were to use as indications of clique structure. A clique was defined as "a subgroup of persons who somewhat consistently support each other and commonly oppose outsiders in conflicts running across problem areas" (1). The observers were instructed to respond to verbal and other behavioral response cues as well as factors in the situation making for clique formation, e.g., differences in social values, interests, jobs, and goals.

Immediately following each conference observers rated the conference on

the following questions: (a) How many cliques were there? (b) Who was in each clique? and (c) To what extent was the group structured into cliques? (Judging on an 11 point scale). Four indices of clique structure were obtained from these ratings.

a. Number of cliques: The sum of the number of different combinations of members identified by one or more of the three observers as cliques. Members may belong to two or more cliques for this index, but there were few cases of overlapping membership. The observers reported 38 groups (56 per cent) with no cliques, 21 groups (31 per cent) with one clique, and 9 groups (13 per cent) with two cliques. The leader was identified as a clique member in 19 groups (28 per cent). The observers identified 32 cliques with two members each, and nine cliques with three, four or five members each.

b. Ratio of number of cliques to size of group: Since a larger group might be expected to be less affected in functioning by the presence of a given sized clique than a smaller group, the number of cliques in each group was divided by the number of members to give a ratio index.

c. Percentage of members in cliques: To take into account both the number of cliques and the size of each clique, an index was computed giving the total number of persons identified as in one or more cliques divided by the number of members in the group.

d. Extent to which group is structured into cliques: Ratings given to Question c above by observers were averaged to give a further overall index of clique structure.

2. *Leader Ratings.* Immediately before each meeting, the conference leader was interviewed and asked the following question with respect to the conference members:

Which of the above people usually 'stick together' in group or committee meetings? (Place an 'A' after each individual mentioned as being in one clique, 'B' after each individual in another clique, 'C' for any third subgroup, etc.)

Three indices of clique structure were obtained from the leader responses, corresponding with three indices obtained from observer ratings: (a) number of cliques; (b) ratio of number of cliques to size of group; and (c) percentage of members in cliques. The leaders identified 45 groups (66 per cent) with no cliques, eight (12 per cent) with one clique, eleven (16 per cent) with two cliques, and four (6 per cent) with three cliques. The leaders identified themselves as clique members in only nine groups (13 per cent). They noted 22 cliques with two members each, and 19 with from three to six members each.

3. *Sociometric Analysis.* In the post-conference interview, each participant was asked to make the following ratings:

How much was each of the individuals needed because of the part he played in the meeting? Assign a number, from zero to ten, for each participant. The highest number,

ten, would indicate that the individual was vitally needed (very valuable and productive) in the group; the lowest rating, zero, would mean that the individual was not needed (not particularly helpful). A rating between these two extremes would indicate varying degrees of being needed.

The resulting set of sociometric ratings were analyzed in two ways. First, the number of cliques in each group was derived from the matrix of mutual ratings within each group. Second, an index of "cliqueness" was derived from the relative number of mutual ratings within the groups.

The first approach involved a matrix analysis of interpersonal ratings following the methods described by Festinger (3) and Luce and Perry (10). Here, the eleven category ratings were first dichotomized into two categories of "high need" and "low need." Ratings of 8, 9, and 10 were considered as reflecting "high need," and ratings of 0 through 7 as indicating "low need." A clique was defined as a subgroup of three or more persons who mutually choose each other, i.e., rate each other "highly needed."

Following the Festinger method, the cliques are identified by cubing the matrix. An alternative, found more practical in the present study, was to use the traditional graphical method. For the relatively small groups used in this investigation, the sociometric chart easily identified all mutual choices, three-way connections, and higher-order connections, showing both the number of persons in each clique and indicating which members these were.

For the second method, the highest 50 per cent of the ratings in the matrix were designated as indicating "high need" and the lowest 50 per cent as indicating "low need." Although distributions of ratings were different in different groups, in this case there was an equal number of "high" and "low" ratings for all groups of a given size. An index of mutuality of choice (high rating and low rating) within groups, or "cliqueness," was obtained by subtracting from the number of mutual choices in the group the number expected by chance, and dividing by the number of persons in the group. A positive score indicates high mutuality of choice, and a negative score indicates low mutuality. This index is compared with other clique indices in Table 1.

Measures of Member Satisfaction

In the post-conference interview each participant member rated his satisfaction with (a) the meeting as a whole, (b) the decisions, (c) the process, and (d) the leader of the meeting. The four group measures were the average of individual ratings on eleven-point scales for the following questions:

(a) "In general, how satisfied are you with this meeting?"
(b) "All things considered, how satisfied are you with the decisions arrived at in this meeting?"

(c) "Although you may or may not be in agreement with the particular decisions this group reached, how satisfied are you with the way the group proceeded to its decisions?"

(d) "How satisfied are you with the way the chairman handled this meeting?"

It was hypothesized that clique structure would correlate negatively with all four outcome ratings. There were no expectations as to which relationships would be the highest.

The validity of the satisfaction ratings is confirmed by responses to questions asked in the post-conference interviews with the conference participants. Questions probing for the factors which the participants took into account in rating their satisfaction with aspects of the meeting indicated that "the way in which the group proceeded and the quality of the group decisions" were primary considerations (12). This conclusion is confirmed by high correlations between the four satisfaction ratings.

RESULTS

The data clearly show a common factor in the measures obtained from observer and leader ratings. There is no evidence, however, that this factor is measured by the sociometric ratings of the conference members.

The intercorrelations among the three indices obtained from observer ratings of the number of cliques are all over .92 (see Table 1), and the inter-

TABLE 1

Relationships Among the Indices of Extent of Clique Structure

	1	2	3	4	5	6	7	8
1. Observer rating: Number of cliques	—	.93	.92	.78	.28	.27	.26	.01
2. Observer rating: Number of cliques/N		—	.96	.59	.24	.24	.23	.03
3. Observer rating: Percentage of members in cliques			—	.66	.31	.31	.29	.00
4. Observer rating: Extent group structured into cliques				—	.31	.26	.24	−.07
5. Leader rating: Number of cliques					—	.97	.93	−.28
6. Leader rating: Number of cliques/N						—	.97	−.09
7. Leader rating: Percentage of members in cliques							—	.00
8. Sociometric rating: Extent of cliqueness								—

Note: N=68. *Product Moment Correlations are Significant at the .05 level, two-tailed test, when* $-.24 \leqslant r \leqslant .24$.

correlations among the indices obtained from leader ratings are over .93. Since indices considering group size and indices ignoring group size correlate highly, for the groups in this investigation the size of the group is not an important determinant of the clique structure. There is relatively small variation in the size of the groups studied here, however, and the number of members could be a significant factor in comparisons between groups varying more in size.

Ratings by observers of the overall extent to which the group was structured into cliques correlate from .59 to .78 with other observer indices, and from .24 to .31 with the leader-rating indices. The intercorrelations between observer-rating indices and leader-rating indices range from .23 to .31.

It should be noted that the number of cliques identified by observers and leaders in a given group is often different. In even fewer cases is there complete agreement on the identification of the members of the cliques. These differences are understandable in view of the different bases for the measures.

The leader identified the pre-conference groupings, while the observers were limited to the interpersonal patterns which arose in the conference itself. The observers were specifically instructed as to cues to use in identifying cliques, while the leaders were given no instructions. The leaders, as well, were personally involved in the meetings, while the observers were personally detached.

The basic hypothesis of the study is fully confirmed. As shown in Table 2, all of the indices derived from ratings by observers and leaders correlate sig-

TABLE 2

Relationships Among Outcome Measures and the Indices of Extent of Clique Structure

	Outcome Ratings			
	Satisfaction with Meeting	Satisfaction with Decisions	Satisfaction with Process	Satisfaction with Leader
1. Observer rating: Number of cliques	−.31	−.33	−.31	−.19
2. Observer rating: Number of cliques/N	−.39	−.35	−.33	−.24
3. Observer rating: Percentage of members in cliques	−.44	−.39	−.44	−.29
4. Observer rating: Extent group structured into cliques	−.30	−.32	−.36	−.25
5. Leader rating: Number of cliques	−.39	−.41	−.48	−.49
6. Leader rating: Number of cliques/N	−.43	−.44	−.46	−.43
7. Leader rating: Percentage of members in cliques	−.38	−.40	−.44	−.45

Note: N=68. *Product Moment Correlations are Significant at the .05 level, two-tailed test, when* $-.24 \leqslant r \leqslant .24$. (All relationships in the table are significant.)

nificantly with all four outcome measures, obtained from ratings by members of their satisfaction with the meeting. Clearly, the extent of clique structure has some form of functional relationship to the success of the groups in meeting the needs of the members.

The observer-rating indices 2 and 3 which are ratios of the number of cliques and number of members in cliques, respectively, to the size of the group, are better predictors of the outcome ratings than index 1, the number of cliques, ignoring the group size. The differences are not significant, however, and the leader ratings show no consistent pattern, so there is no evidence here for a need to take the group size into account.

The indices based on leader ratings are consistently better predictors of the outcome measures than the observer rating indices, with the difference approaching, but not reaching, a level of statistical significance. It is reasonable to expect that leaders in such functioning executive groups would have considerable insight into the group structure. This finding is consistent with the observation by Guetzkow, using other data from the Conference Research Project, that only members who achieve high status in a group come to the point of understanding the group structure in realistic terms (7).

DISCUSSION

Clique structure is related to group satisfaction. Why? A complete answer cannot be given, but the data provide several strong suggestions. First, were there conflicting interests present within the groups before the meeting which could directly account for the resulting level of satisfaction, independent of what went on in that meeting? Apparently this is the case, since the leader ratings, which correlated most highly with satisfaction ratings, were made before the meeting entirely on the basis of the preëxisting clique structure, rather than on any activity within the meeting.

Second, was a clique structure manifest in the meeting itself which could have affected the process and decision of the meeting and feelings of the members? The relationships between observer ratings and member satisfaction support this contention, although the specific ways in which cliques interacted within the groups were not directly observed. The observers were unfamiliar with the long-term structure of the groups studied, and their ratings were based solely on the interactions taking place within that meeting.

The fact that both leader and observer ratings were related to member satisfaction, and that the specific subgroups identified by leaders were not closely related to those identified by observers in the meeting, suggest that subgroup organization may change substantially from situation to situation. Groups apparently do have a persistent clique structure which affects reactions to many situations, as suggested by the leader ratings. But the particular

characteristics of a specific problem may prompt the formation of coalitions which dominate the interaction patterns at that time, but which may have only a temporary existence.

The disruptive effects of cliques can also be understood in terms of role conflict aroused by clique membership. The clique member is thrust between the norms and pressures of the clique and those stemming from identification with the overall group. In reviewing studies of role conflict Stogdill concludes that "role conflict may be expected to affect integration adversely. When a group member is subjected to conflicts in demands, loyalties, judgments and commands, his behavior is either inhibited or tends to exhibit a comparatively high degree of variability and indecision" (15). In either case the effects can be expected to reduce member satisfaction significantly.

The measures obtained from the matrix of interpersonal ratings by conference members do not correlate significantly with the other clique indices or with the measures of satisfaction with the group. The dimension involved in the ratings, of how much each individual was "needed," was expected to reflect factors important to the formation of subgroups. None of several criteria used for identifying cliques from these data was useful, however, in providing indices that were related either to other clique measures or to group outcome. It is possible that other dimensions, such as the amount of liking of other members, as used commonly in sociometric studies, would identify a clique structure which would affect group functioning.

There are certain obvious limitations in the generalizability of this relationship of clique structure to member satisfaction. First, satisfaction of group members is only one of several variables of group outcome, and numerous studies have shown the complex and variable relationships between member satisfaction, objective measures of group productivity, and other results of group activity. It is generally recognized that conflict can have constructive as well as disruptive effects on group activity. In a production situation in industry, for example, conflict may spur increased effort, and greater production. In decision-making groups, however, conflicting interests are more likely to lead to success for one subgroup and dissatisfaction for others, or a compromise which may satisfy no subgroup completely.

The effects of intragroup conflict will depend upon the nature of the problem met, the way members are rewarded, and other aspects of the total group situation. It was assumed for the present study that clique structure increased the likelihood of conflict, and that given the decision-making responsibilities of the groups studied, the effects would be more disruptive than constructive. The results support this reasoning. It is likely also that cliques would play a more significant role for the groups studied than for other groups, where the members were not engaged in arriving at decisions on important issues, were at diverse status levels, or did not know each other well.

SUMMARY

This study is concerned with the effect of clique structure of groups on the satisfaction of members with the process and decisions of group meetings. As part of a field study of group process and outcome in business and government conferences, the investigation determines the intercorrelations of several measures of the extent of clique structure in the groups, and tests the hypothesis that the extent of clique structure will correlate negatively with the satisfaction of members with the group and the meeting.

Cliques in 68 conference groups of five to 15 members each were identified (a) by conference leaders in an interview before the meeting; (b) by trained observers following observation of the meeting, and (c) by a sociometric analysis of ratings by all members of each group as to the importance of the role each had played in the meeting. Satisfaction of the group with the meeting as a whole, and with the process, decisions and leader of the meeting was measured by the average of the ratings of all participants given immediately after the conference.

The observer and leader clique measures were significantly related, but the sociometric ratings were not related to either observer or leader ratings. Taking the size of the group into account did not improve the usefulness of the indices.

The extent of clique structure identified by leaders related negatively to each of four measures of member satisfaction. Since leader ratings were made before the meetings, the influence of long-term subgroup organization on satisfaction is suggested. The negative relation of observer ratings of clique structure with each of the four satisfaction measures indicates an impact of subgroup organization on the process of each meeting. The indices based on a sociometric analysis of interpersonal ratings were unrelated to member satisfactions.

Manuscript received: June 22, 1959
Revised Manuscript received: December 15, 1959
Earl R. Carlson
Department of Psychology
Michigan State University
East Lansing, Michigan

BIBLIOGRAPHY

1. Berkowitz, L., "Manual for Over-All Observers," (mimeographed paper) Conference Research Project, University of Michigan, 1949.
2. Bonner, H., *Group Dynamics*, New York: Ronald Press, 1959.
3. Festinger, L., "The Analysis of Sociograms Using Matrix Algebra," *Human Relations*, 1949, 2, 153–158.

4. Fiedler, F. E., "Interpersonal Perception and Sociometric Structure in Prediction of Small Team Effectiveness," *American Psychologist*, 1954, 9, 365.
5. French, J. R. P., Jr., "The Disruption and Cohesion of Groups," *Journal of Abnormal and Social Psychology*, 1941, 36, 361–377.
6. Glanzer, M., and R. Glaser, "Techniques for the Study of Group Structure and Behavior: I. Analysis of Structure," *Psychological Bulletin*, 1959, 56, 317–332.
7. Guetzkow, H., "Differentiation of Roles in Task-Oriented Groups," Unpublished report.
8. Guetzkow, H., and J. Gyr, "An Analysis of Conflict in Decision-Making Groups," *Human Relations*, 1954, 7, 367–382.
9. Harary, F., and I. C. Ross, "A Procedure for Clique Detection Using the Group Matrix," *Sociometry*, 1957, 20, 205–215.
10. Luce, D. R., and A. D. Perry, "A Method of Matrix Analysis of Group Structure," *Psychometrika*, 1949, 14, 95–116.
11. March, J. G., and H. A. Simon, *Organizations*, New York: Wiley, 1958.
12. Marquis, D. G., H. Guetzkow, and R. W. Heyns, A Social Psychological Study of the Decision-Making Conference. In H. Guetzkow (Ed.), *Groups, Leadership and Men*. Pittsburgh: Carnegie Press, 1951. Pp. 55–67.
13. Mouton, J. S., R. R. Blake, and B. Fruchter, "The Validity of Sociometric Responses," *Sociometry*, 1955, 18, 181–206.
14. Seashore, S. E., "Group Cohesiveness as a Factor in Industrial Moral and Productivity," *American Psychologist*, 1954, 9, 468.
15. Stogdill, R. M., *Individual Behavior and Group Achievement*, New York: Oxford University Press, 1959.
16. Thibaut, J. W., and H. H. Kelley, *The Social Psychology of Groups*, New York: Wiley, 1959.

Attitude Development and Ratio of Reinforcement [1]

CAROLYN K. STAATS, ARTHUR W. STAATS, AND WILLIAM G. HEARD

Arizona State University

The statement that attitudes are learned almost always as a result of "the adoption of ready-made attitudes of parents, teachers, or playmates" (1, p. 811) rather than as a result of personal experiences has been well documented (e.g., 4, 11). The process through which the adoption of ready-made attitudes occurs has yet to be fully specified, however. It is insufficient to say that attitudes are learned, in part, through communication from one individual or group to another. The actual process of learning attitudes in this manner must be described and analyzed if we are to be in a position to predict and control the acquisition of individual attitudes and group prejudices. The present study investigates the principles by which attitudes may be adopted, i.e., learned, through communication.

A number of investigators, e.g., Mowrer (14), Osgood (15), Staats and Staats (22), consider word meaning to be a response which is acquired according to the principles of classical conditioning. This interpretation states that when a word is contiguously presented with a stimulus object, the conditionable part of the response elicited by the object is conditioned to the word. This conditioned response becomes the meaning of the word.

According to this view, all objects in an environment elicit responses from an organism. For example, food objects when put in the mouth elicit responses of tasting, chewing, swallowing; a ball in the hand elicits certain other responses: grasping, throwing, etc. Some of these responses are dependent for their elicitation upon the actual sensory presence of the object for their occurrence, but others can occur without the object being present. These latter responses have been termed "detachable." These detachable responses may become *conditioned* to the verbal stimuli with which the object is repeatedly paired. Thus a word comes to elicit in an individual part of the response which the object itself elicits. For example, the word BAD is paired with aversive stimulation (punishment) many times in a child's life history. The punishment elicits a number of responses which are called "unpleasant." After BAD has been paired with punishment a number of times the detach-

[1] We gratefully acknowledge the support of the National Institute of Mental Health, U. S. Public Health Service, under Grant M–2381, and the support of the Office of Naval Research under Contract Nonr–2794 (02). A summary of this article was presented at the national meetings of the American Psychological Association, Division of Personality and Social Psychology, in Cincinnati, Ohio, September, 1959.

able, or conditionable, responses elicited by the punishment are conditioned to BAD. These responses constitute the meaning of BAD. Later, if a person with this history is asked what the word BAD means to him, he will report that the word has unpleasant meaning. The conditioning process is schematized in Fig. 1, part a.

Assuming that the conditioning has been sufficiently strong, contiguous presentation of BAD and another word which has no meaning would result in *higher-order conditioning*. That is, the meaning response elicited by BAD would be conditioned to some extent to the new word. In an actual life situation, a child might be told "Negroes are bad." The negative meaning elicited

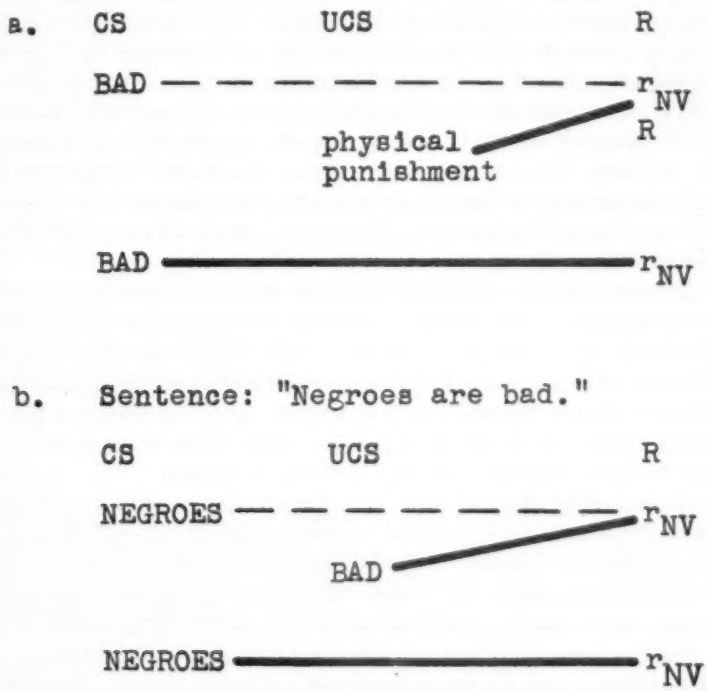

FIGURE 1

The diagram depicts first-order conditioning of word meaning. After a number of pairings of BAD, the CS, with punishment, the US, BAD comes to elicit the conditionable (i.e., "detachable") components of the responses elicited by the punishment (symbolized as r_{NV} because of the negative value). The components of the total response which are not stably conditioned are symbolized as R. Diagram b depicts higher-order conditioning of meaning. The negative meaning responses now elicited by BAD are conditioned to NEGROES through contiguous pairing of the two words in the sentence.

by BAD would be conditioned to NEGROES. This process of language conditioning is depicted in part b of Fig. 1.

In an attempt to establish a firm behavior theory interpretation of attitude development, a number of investigators have also defined attitude in terms of such a concept of a learned mediating response. Doob (3) has analyzed the concept of attitude within the framework of the same type of behavior theory described above, identifying attitudes as implicit anticipatory, mediating responses. Osgood and Tannenbaum have agreed that attitudes are implicit responses, and they identify the nature of the implicit attitudinal response in terms of a certain dimension of meaning. They have said, ". . . The meaning of a concept is its location in a space defined by some number of factors or dimensions, and attitude toward a concept is its projection onto one of these dimensions defined as 'evaluative' " (17, p. 42). Thus attitudes elicited by words are considered to be one type of meaning. In the previous example, when the person reports the word BAD to be unpleasant, he would be said to have developed a negative attitude toward the word. Similarly, Rhine has discussed attitude development based upon concept formation in which "an attitude was defined as a concept with an evaluative dimension, and the mediating response was employed to explain attitude learning" (19, p. 369).

If attitudes are to be considered responses, however, it must be experimentally demonstrated that attitude formation and change can be adequately explained by the principles established for the learning of other responses. An example of such a study is an experiment by Eisman. She indicated that a "color preference response (positive attitude) could be developed through mediated generalization" (6, p. 315). This result would be expected on the basis of learning principles established with other responses.

In demonstrating that the concept of attitude may be treated similarly to a conventional conditioned response, Staats and Staats (21) paired different words possessing a common evaluative response component with the same national or proper name, e.g., Dutch. Ostensibly, the subject's task was to separately learn visually presented names and auditorily presented words. The names were found to have acquired the predicted attitudinal loading, i.e., a positive attitude toward the national name when the words with which it was paired were positive, a negative attitude when the paired words were negative in evaluative meaning. The subjects were not aware of the systematic pairing of names and words, indicating that attitude responses can be conditioned to socially significant verbal stimuli even when subjects are unaware of the purpose of the experiment.

Further studies of the principles of behavior should be productive in the quest for greater accuracy of prediction of and finally for control of the de-

velopment of attitudes. Two types of experimental programs are necessary: (a) to establish more precisely the principles involved in the acquisition of attitudes, and (b) to extend these discoveries into practical situations. The present article represents a step in the direction of the first goal, i.e., to further extend the principles of classical conditioning as they apply to attitude development. One of these principles, i.e., that schedule of reinforcement has an effect on the conditioning of responses, has been widely shown in more basic experiments with humans. For example, Grant and Schipper (7) found that the per cent frequency of conditioned responses during acquisition was a function of the percentage of reinforced trials. In general, the per cent frequency increased as the percentage of reinforcement increased. Ross (20) also investigated the effects of 50 per cent partial reinforcement during an extended number of acquisition trials and concluded that although both 50 per cent and 100 per cent groups reached stable asymptotes, the partial group was significantly below that of the 100 per cent group. That is, in both cases partial reinforcement resulted in less conditioned response acquisition than did continuous reinforcement.

If attitudes are to be considered learned implicit responses, then not only should it be possible to condition classically the attitude component of the total meaning of words to other verbal stimuli, as shown in the previous study, but the acquisition of conditioned attitude responses should be a function of the percentage of fixed-ratio reinforcement. The purpose of the present study is to test this hypothesis using the method of language conditioning of the earlier study of Staats and Staats.

METHOD

Subjects

One hundred and fourteen students in elementary psychology participated individually in the experiment as subjects, to fulfill a course requirement. They were randomly divided into the three equal-sized reinforcement groups, each containing an equal number of men and women.

Procedure

The general procedure employed was the same as in the study of Staats and Staats (21). Two types of stimuli were used: nonsense syllables which were presented visually by slide projection on a screen (conditioned stimuli) and words which were presented orally by the experimenter (unconditioned stimuli), with the subjects required to repeat the word aloud immediately after the experimenter had pronounced it. Although names have been used as conditioned stimuli in a previous study of attitude formation (21), in this experi-

ment nonsense syllables were selected in order to keep the conditioned stimuli as free from bias based on prior experience as possible.

A subject was seated comfortably in a semi-dark room where he was told that he was to be in an experiment concerned with two different types of learning—to see the effectiveness of each. One of the tasks was to concern visually presented syllables, and the other was to concern auditorily presented words.

Four nonsense syllables were presented in random order, with exposures on the screen of five seconds. These syllables were the neutral conditioned stimuli: YOF, XEH, LAJ, and QUG. Approximately one second after the syllable appeared on the screen the experimenter pronounced a word aloud. The intervals between presentation of syllables were less than one second. The subject was told that he could learn the syllables by just looking at them, but that he should simultaneously concentrate on pronouncing the words aloud and to himself since there would be many words, each presented only once.

When the conditioning phase was completed, the subject was told that the experimenter first wished to find out how many of the visually presented syllables he remembered. At the same time, he was told, it would be necessary to find out how he *felt* about the syllables since that might have affected how they were learned. The subject was given a small booklet containing six pages. On each page was printed a nonsense syllable and a semantic differential scale. The scale was the seven-point scale of Osgood and Suci (16) with the continuum from pleasant to unpleasant. An example is as follows:

XEH

pleasant:_____:_____:_____:_____:_____:_____:_____:unpleasant

The subject was instructed on how to mark the scale and to indicate at the bottom of the page whether or not the syllable was one of those that had been presented.

Each subject was then tested on the auditorily presented words. Finally, he was asked to write down anything he had thought about the experiment, especially the purpose of it, and so on, or anything he had thought of during the experiment. It was explained that this might have affected the way he had learned.

Experimental Design

Three reinforcement conditions, 100 per cent, 50 per cent, and 0 per cent, were employed and the subjects were randomly assigned to one of these conditions. A reinforced trial consisted of a nonsense syllable paired with a word of positive or negative evaluative meaning. Most of the evaluative

words were taken from Osgood and Suci (17). When appropriate words with high loadings could not be found in this way, a thesaurus supplied them. A non-reinforced trial consisted of a nonsense syllable paired with a word of no systematic meaning.

On each presentation, the conditioned stimulus (*CS*) syllable was paired with a *different* auditorily presented word. A *CS* syllable was never paired with an unconditioned stimulus (*US*) word more than once, preventing the formation of stable associations between particular syllables and words. The *CS* syllables YOF and XEH were selected for 0 per cent, 50 per cent, or 100 per cent pairing with *US* words of evaluative meaning.

In the 100 per cent reinforcement group, YOF was always paired with words of positive evaluative meaning, e.g., GIFT, LOVE, HONEST, and XEH was always paired with words of negative evaluative meaning, e.g., TROUBLE, CRIMINAL, SOUR. The *CS* syllable QUG was paired with words consisting of building materials, e.g., CEMENT, SCREWS, PLASTER. The remaining *CS* syllable LAJ was paired with transportation words, e.g., TAXI, SLED, TRAIN. Each syllable was visually presented 12 times, resulting in 48 different syllable-word pairings.

In the 0 per cent group, QUG and LAJ were paired with the same words as in the 100 per cent group, but YOF and XEH were paired with words of unsystematic meaning, e.g., TWELVE, BECAUSE, ALONG. The order of the syllable presentations was the same as in the 100 per cent group and again there were 48 different syllable-word pairings.

For the 50 per cent group, on half of the presentations the crucial *CS* syllables were paired with the same 12 positive or 12 negative evaluative words, but on the other presentations the *US* were neutral words (the same neutral words as used in the 0 per cent reinforcement group). In order to keep the *number* or reinforcements constant for the 50 per cent and 100 per cent groups, there were thus 96 syllable-word presentations in the 50 per cent group. For this group, LAJ and QUG were also presented 24 times, but always with a word of a transportation or a building material class.

In a previous study (e.g., 23) a counterbalanced design was used, i.e., for half the subjects YOF would be paired with words of positive evaluative meaning and XEH with words of negative evaluative meaning, while for the remaining subjects this pairing was reversed. The counterbalancing showed that the acquisition of meaning was due to the particular words with which the syllable was paired rather than to the meaning of the syllable itself. In addition the syllables were found to be approximately equal in evaluative meaning. For this reason, in the present experiment it was decided to consider the 0 per cent group as a control for initial meaning of the syllables rather than to counterbalance.

TABLE 1

Means and SD's of Conditioned Attitude Scores

	Per Cent of Reinforcement					
	0%		50%		100%	
	Mean	SD	Mean	SD	Mean	SD
Males	.74	1.37	1.58	2.76	2.47	3.05
Females	.95	1.67	2.58	2.39	4.16	2.01

Note: On the scales, pleasant is scored 1, unpleasant 7. The table entries here represent the differences between the syllable associated with positive words and the syllable associated with negative words.

RESULTS

The semantic differential was scored with "pleasant" as 1 and "unpleasant" as 7 on the continuum. The extent of conditioning for each subject was determined by subtracting his score for YOF (associated with positive words) from his score for XEH (associated with negative words). Table 1 presents the means and *SD*s of the difference scores for the three reinforcement groups and for the sexes.

Analysis of variance showed that there was a significant difference in the extent of conditioning among the three groups and between the sexes, with women conditioned more strongly than men. The analysis of variance is summarized in Table 2.

In order to determine which of the differences between reinforcement group means accounted for the significant *F*, a multiple range test as suggested by Duncan (5) was conducted. All of the differences between means are significant at the .05 level.

Finally, the number of subjects who become aware of the relationship between either of the *CS* syllables YOF and XEH and the class of *US* words with which they were paired are shown in Table 3 for the 50 per cent and

TABLE 2

Analysis of Variance of Conditioned Attitude Data

Source of Variation	df	MS	F
Schedule of reinforcement	2	58.43	10.60**
Sex	1	27.14	5.94*
Interaction	2	4.57	
Within	108	5.51	
Total	113		

* $p < .05$.
** $p < .01$.

TABLE 3

Number of Subjects Aware of Relationship between a Syllable and a Class of Words

	Aware	Not Aware
50% group	10	28
100% group	17	21

100 per cent groups. A chi square test showed that the difference in number of aware subjects was independent of the reinforcement condition (Chi Square=2.814, df=1).

DISCUSSION

The present study further supports the conception that attitudes are responses by showing that attitudes possess another of the functional properties of a response. The conditioning of attitudes was consistent with basic research on acquisition of responses: there was stronger attitudinal response acquisition under continuous reinforcement than under partial reinforcement.

The general conception of the process of formation of the attitudinal response is shown in Fig. 2. The nonsense syllable YOF, in this example, is presented prior to the word *gift*. Gift elicits a meaning response. In the figure this is shown as two component responses: an evaluative response or attitudinal response r_{PV} (in this example, the words have a positive value), and the other distinctive responses that characterize the meaning of the word, R_G.

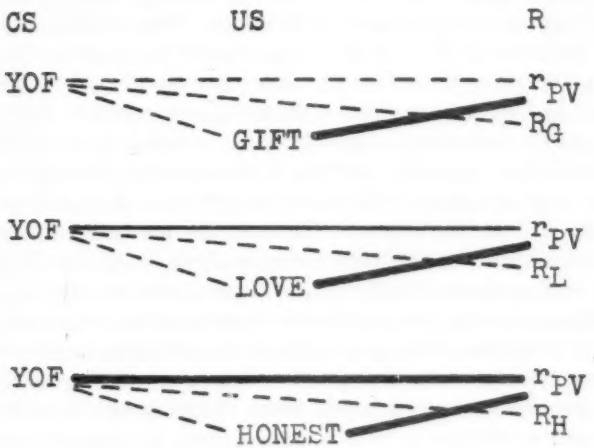

FIGURE 2

The Language Conditioning of a Positive Attitude

The pairing of YOF and *gift* results in associations between YOF and r_{PV}, and YOF and R_G. In the following presentations of YOF and the words *love* and *honest,* the association between YOF and r_{PV} is further strengthened. This is not the case with associations R_G, R_L, and R_H since they occur only once and are followed by other associations which are inhibitory. The direct associations indicated in the figure between the syllable and the individual words would also in this way be inhibited. The paradigm is presented for the 100 per cent reinforcement group. For the 50 per cent group, only half the *US* words elicit r_{PV}, while in the 0 per cent group r_{PV} would not be elicited at all.

The question might still be raised as to whether the less intense attitude conditioning in the 50 per cent group as compared to the 100 per cent group might be a function of the small number of conditioning trials for both groups. During prolonged training for both groups the performance of a 50 per cent group might approach that of a 100 per cent group. Ross's results with extended numbers of trials indicated, however, that some type of decremental factor results from non-reinforced trials. In the present experimental situation, therefore, it would be expected that the difference in attitude strength shown in the two groups would be maintained with further conditioning trials, i.e., a continued increase in attitude strength of the 50 per cent group to the 100 per cent group level would not be expected.

The model of attitude development presented earlier, which is supported by the present study, may be used to account for the development of attitudes towards groups, purely on a vicarious basis through verbal means, in the absence of any direct experience with the object of the attitude. For example, consider the attitudes of most Americans toward the Japanese people prior to, during, and after World War II. Although many of these Americans had never had any direct experience with a Japanese person, their attitudes changed rapidly and in some cases from one extreme to the other. During World War II the aggressive reactions were associated particularly with the term "Jap" and this name itself became derogatory in connotation. That the mass media may aid the process of learning the prevailing attitude is well documented. Berelson and Salter's content analysis of short stories published in widely read magazines in the United States indicated that there is substantial difference in the presentation of "Americans" as contrasted with that of minority groups or of foreigners (2). In general these latter groups were described in negative terms, e.g., gangster, ignorant, sly, and shrewd, etc.

Using the model presented in this paper, it can be seen how the acquisition of negative attitudes in these situations could be accounted for. Pairing the names (and pictures, etc.) with words which elicit negative attitudes

should condition the attitudes to the names. During the war, in all probability, many sentences with "Japanese" as the subject (*CS*-word) and with words eliciting negative attitudinal responses as the predicate (*UCS*-words) were presented to the American audience. It would be expected that these negative attitudes would have been conditioned to the name Japanese since the *CS*-word and *UCS*-words in the sentences would be in close contiguity. (See Mowrer [14] for a more detailed discussion of communication in these terms.)

It should be pointed out that although continuous reinforcement has been shown to lead to more intense attitudes, another behavior principle should be considered as well. Many experimental studies of conditioning (7, 20) show that responses acquired under partial reinforcement are much more resistant to extinction than are those acquired under continuously reinforcing conditions. It would be expected, therefore, that although more intense attitudes are acquired under the continuous reinforcement condition, the attitude would be more resistant to change if acquired under partial reinforcement. This and other extensions of the learning approach need further study.

Studies of attitude change as a function of certain variables in deliberately prepared communication messages, however, are relevant to this point. For example, the comparative effectiveness of one-sided messages (i.e., where one side of a controversial issue is favored) versus two-sided messages (where arguments of both sides are presented) has been studied by a number of investigators (8, 9, 10, 12, 13). The present results and the general S-R approach would lead us to predict that one-sided communications (continuous reinforcement) would be more effective in developing strong attitudes, while two-sided arguments (partial reinforcement) would lead to greater resistance to change. Experimental evidence seems to confirm these predictions.

The results of Hovland, Janis, and Kelley, for example, substantiate the prediction that one-sided communication is more effective than two-sided communication in establishing strong attitudes. They conclude on the basis of a number of studies that one-sided communication presenting only positive arguments will tend to sway the audience farther in the direction advocated by the communicator than will two-sided communications (10, p. 111).

In a study analogous to the partial reinforcement situation, Lumsdaine and Janis (12) found that a two-sided communication was markedly more effective than a one-sided argument when the audience was subsequently exposed to counter-propaganda, i.e., attitudes learned in this way were more difficult to change. This would confirm the hypothesis derived from the present orientation that attitudes learned under partial reinforcement should be more resistant to extinction.

Thus, the results of these two studies would seem to be specifically pre-

dicted on the basis of the present study and the principles of learning involved. Further research is needed to explore the principles underlying the effect of prepared communication messages.

Another problem with respect to the effect of communication has been the audience's perception of the communicator's intention to persuade. Hovland, Janis, and Kelley say: "As a result of learning experiences . . . most individuals acquire strong motives which incline them to notice signs of communicator intent and to avoid being influenced when they expect that the communicator is attempting to manipulate them" (10, p. 295).

In the terminology used in the present study, it might be said that the awareness of the subject may be an important variable determining the formation of attitudes through language conditioning. If that is the case, the variables (e.g., partial reinforcement) underlying awareness of attitude conditioning should be studied. The present study showed that although there was not a significant difference between the continuously and partially reinforced groups in number of subjects who were aware of the systematic syllable-word relationships, the results were in the direction of continuous reinforcement yielding more awareness ($p < .10$). However, since the present results are not conclusive in this respect, the influence of schedule of reinforcement upon an individual's awareness of the attempt to affect his attitude and upon consequent attitude acquisition needs to be further explored. Understanding of the principles involved should be very important in the practical situation.

The occurrence of sex differences with respect to attitude learning is another factor which should be investigated in the future. The relevant possible explanations might be in terms of more rapid language learning of women or differences in the meanings of the *UCS* words for men and women. Since no data were collected on these points it is not possible to interpret the results of the sex difference.

Finally, then, the results give further support to the general approach which assumes that the learning model applies not only to simple responses and simple organisms, but is also very pertinent in understanding even the complex activities of communication and attitude development in man. In this, the approach is consistent with that of Hovland and some of his associates. McGuire, for example, states: "There is great promise that a substantially better understanding of the influence process can be obtained from an application of stimulus-response reinforcement theory principles to the communication persuasion situation" (13, p. 114).

It is suggested that it is, at least in part, through language conditioning that attitudes are developed and changed in everyday life (e.g., attitudes toward the Japanese during the War). Therefore, the present experimental

method may itself be valuable as a procedure for studying the different variables which may affect attitude development through communication.

SUMMARY

The experiment tests the hypotheses that attitudes elicited by a word can be conditioned to a contiguously presented verbal stimulus and that the intensity of the acquired attitude is a function of the percentage of reinforcement. A nonsense syllable was presented a number of times, each time paired with the auditory presentation of a different word. Three reinforcement conditions (100 per cent, 50 per cent, and 0 per cent) were employed. A reinforced trial consisted of a nonsense syllable paired with a word of positive or negative meaning; a non-reinforced trial consisted of a nonsense syllable paired with a word of no systematic meaning. The results agree with basic research findings on the principles of conditioning, i.e., attitude intensity was significantly greatest in the 100 per cent group, intermediate in the 50 per cent group (although number of reinforced trials were equal in the two groups), and least in the 0 per cent group.

Manuscript received: May 19, 1959
Revised Manuscript received: January 11, 1960

Carolyn K. Staats
Department of Sociology
Arizona State University
Tempe, Arizona

REFERENCES

1. Allport, G. W., "Attitudes," in C. Murchison (ed.), *A Handbook of Social Psychology*, Worcester, Mass.: Clark University Press, 1935.
2. Berelson, B., and P. J. Salter, "Majority and Minority Americans: An Analysis of Magazine Fiction," *Public Opinion Quartery*, 1946, 10, 168–190.
3. Doob, L. W., "The Behavior of Attitudes," *Psychological Review*, 1947, 54, 135–156.
4. Doob, L. W., *Social Psychology*, New York: Holt, 1952.
5. Duncan, D. B., "Multiple Range and Multiple F Tests," *Biometrics*, 1955, 11, 1–42.
6. Eisman, B. J., "Attitude Formation: The Development of a Color Preference Response through Mediated Generalization," *Journal of Abnormal and Social Psychology*, 1955, 50, 321–326.
7. Grant, D. A., and L. M. Schipper, "The Acquisition and Extinction of Conditioned Eyelid Responses as a Function of the Percentage of Fixed-Ratio Random Reinforcement," *Journal of Experimental Psychology*, 1952, 43, 313–320.
8. Hovland, C. I. (ed.), *The Order of Presentation in Persuasion*, New Haven: Yale University Press, 1957.
9. Hovland, C. I., A. A. Lumsdaine, and F. D. Sheffield, *Experiments on Mass Communication*, Princeton: Princeton University Press, 1949.
10. Hovland, C. I., I. L. Janis, and H. H. Kelley, *Communication and Persuasion*, New Haven: Yale University Press, 1953.

11. Lasker, B., *Race Attitudes in Children*, New York: Holt, 1929.
12. Lumsdaine, A. A., and I. L. Janis, "Resistance to 'Counterpropaganda' Produced by One-Sided and Two-Sided 'Propaganda' Presentations," *Public Opinion Quarterly*, 1953, 17, 311–318.
13. McGuire, W. J., "Order of Presentation as a Factor in 'Conditioning' Persuasiveness," in C. I. Hovland (ed.), *The Order of Presentation in Persuasion*, New Haven: Yale University Press, 1957.
14. Mowrer, O. H., "The Psychologist Looks at Language," *American Psychologist*, 1954, 9, 660–694.
15. Osgood, C. E., *Method and Theory in Experimental Psychology*, New York: Oxford University Press, 1953.
16. Osgood, C. E., and G. J. Suci, "Factor Analysis of Meaning," *Journal of Experimental Psychology*, 1955, 50, 325–338.
17. Osgood, C. E., and P. H. Tannenbaum, "The Principle of Congruity in the Prediction of Attitude Change," *Psychological Review*, 1955, 62, 42–55.
18. Osgood, C. E., G. J. Suci, and P. H. Tannenbaum, *The Measurement of Meaning*, Urbana: University of Illinois Press, 1957.
19. Rhine, R. J., "A Concept-Formation Approach to Attitude Acquisition," *Psychological Review*, 1958, 65, 362–370.
20. Ross, L. E., "The Decremental Effects of Partial Reinforcement During Acquisition of the Conditioned Eyelid Response," *Journal of Experimental Psychology*, 1959, 57, 74–82.
21. Staats, A. W., and C. K. Staats, "Attitudes Established by Classical Conditioning," *Journal of Abnormal and Social Psychology*, 1958, 57, 37–40.
22. Staats, A. W., and C. K. Staats, "Meaning and (M): Correlated but Separate," *Psychological Review*, 1959, 66, 136–144.
23. Staats, C. K., and A. W. Staats, "Meaning Established by Classical Conditioning," *Journal of Experimental Psychology*, 1957, 54, 74–80.

Self-Conception and the Reactions of Others

RICHARD VIDEBECK,* *University of Nebraska*

The view that one's self-conception is learned from the reactions of other individuals to him has achieved wide acceptance in social psychology today, but its implications have not been much exploited empirically. Helper (3), Manis (4), and Miyamoto and Dornbusch (6) report findings which show that an individual's self-ratings are significantly correlated with the ratings of him made by his associates. Their work on the social origins of the self is lodged in Cooley's formulation of the "looking glass self" (1), and in Mead's conception of the self as an organization of socially derived and symbolically represented self-identification (5). Helper, Manis, and other investigators make inferences from their findings about the tenability of this general view, but they do not demonstrate that "other's reactions" are necessary antecedent conditions to self-ratings. It is the purpose of the study reported in this paper to test the hypothesis in a more direct fashion, by experimentally varying the reactions of others and observing subsequent changes in self-ratings.

Self-conception is a term used to refer to a person's organization of his self attitudes. Operationally, it is frequently defined as a set of interrelated self-ratings, usually upon bipolar scales using some personal or behavioral quality as the referent of the scale. It is possible to distinguish between *ideal-self* ratings, i.e., the degree of the attribute implied in the scale which the person would like to possess, and *actual-self* ratings, i.e., the extent to which, in the person's own opinion, he currently possesses the specified scale attribute. This report is concerned only with changes in the latter self-ratings. As used here, actual-self ratings are defined as *reinforced* scale responses. It is assumed that the person's choice of one scale point over the alternative points on the scale reflects the fact that informational cues have been supplied to the individual which "verify or validate" the selected scale point as being correct. According to the hypothesis, the principal source of such cues lies in the reactions of other people to the individual. Commonly, in the course of social interaction, other persons will express some degree of approval or disapproval of the individual or his behavior. The expressed degree of approval or disapproval is such a cue. Insofar as these expressions represent reward or punishment for the individual, the other's reactions reinforce a particular

* The writer is indebted to Drs. Alan P. Bates, Harry Shelley, and John C. Loehlin for suggestions and criticisms. The project grew out of the writer's joint work with Alan Bates in the area of role analysis.

self-rating response. The response which is reinforced by such reaction is the choice of that point on the rating scale which corresponds to the degree of approval or disapproval inferred from the reaction. In simple outline, if a person is told that he is doing something very well, he will be *more likely* to rate himself as being more capable of doing that something or possessing the qualities related to doing it, than if he had been told he was doing it poorly.

The extent to which another can effectively reinforce an individual's self-rating response on a specific scale will depend on a number of factors, of which only four are considered here. First it will depend upon the *number of times* the other consistently approves or disapproves of the individual with reference to the specific qualities of the scale referent. Secondly it will depend upon *how appropriate or qualified the other is,* in the opinion of the individual, to show approval or disapproval. Thirdly it will depend upon how *strongly motivated* the individual is with reference to the attribute of the scale, i.e., how strongly he strives to attain some ideal-self point on the scale. Fourth, the effectiveness of another's reaction in reinforcing the individual's self-rating response will vary with the *intensity* with which the approval or disapproval is expressed, i.e., the other's apparent confidence and conviction of his expression. If these four conditions are held constant at a level sufficient to insure reinforcement of an individual's self-ratings, two hypotheses about the effects of another's reaction can be stated: (a) If another person reacts approvingly toward the individual with reference to some specified attribute, then the subject will change his actual-self rating, re that attribute, to a point closer to his ideal-self rating; but if the other reacts disapprovingly, then the subject will change his actual-self rating to a point farther away from his ideal-self rating. (b) If disapproving reactions do not substantively differ from approving reactions except for the element of negation, then there will be no difference in absolute amounts of change in self-ratings between subjects reacted to approvingly and disapprovingly, with reference to a given attribute.

Defining self-conceptions as organizations of interrelated sets of self-ratings may be interpreted to mean that in some way changes in one scale, measuring self-ratings, will lead to changes in the self-ratings upon other scales. If the attribute of a scale is viewed as a stimulus pattern, then by the principle of stimulus generalization it can be hypothesized that: (c) If another person reacts approvingly or disapprovingly to the qualities of an individual referred to in one scale, and if as a result the individual changes his self-rating on that scale, he will also change his self-ratings on other scales to the extent that the attributes of these other scales are functionally similar to the evaluated attribute.

METHOD

To test the hypotheses, a 2 by 3 design was employed, with two variations in the evaluative reactions of another, and three variations of similarity between rating-scale attributes. The three dependent variables, corresponding to the three hypotheses, are (a) the direction of change, (b) the amount of change, and (c) the spread of change of self-rating responses.

Thirty subjects, who had been rated superior by their instructors, were chosen from introductory speech classes. They were told that they would participate in an experiment to determine whether men or women were better in certain forms of oral communication. In the experimental session each read six poems. After the subject had read each poem, a person, who had been introduced as a visiting speech expert, evaluated the subject's reading performance. The subjects had been randomly assigned to one of the two "evaluative treatments." Regardless of the objective quality of their performance, half the subjects received approving reactions and half received disapproving reactions. The evaluative reactions were standardized, prepared statements which the "experts" read as if they were their own comments.

Before and after the experimental session, each subject rated himself on 24 items, each of which began with the prefatory phrase: "If you were required to, how adequately could you . . ." A nine-point scale was used with "extremely adequate" and "extremely inadequate" defining the poles of the scale. Sixteen of the items dealt with aspects of oral intepretive reading in which all of the subjects had had equal and extensive training in their speech course. Eight of these items specifically dealt with (a) conveying meaning and emotional tone and (b) voice control in oral reading. These items constituted the *Criticized Scale,* since the reactions of the "expert" were exclusively confined to the referents of these eight items. The other eight items constituted a scale which is called the *Related Scale,* because they are substantively similar to the items of the Criticized Scale, but were not reacted to by the expert. The remaining eight items dealt with oral communication in general social situations, such as leading a discussion group, engaging a stranger in conversation, etc. This scale is called the *Unrelated Scale,* to indicate that it is substantively less similar to the Criticized Scale than is the Related Scale.

After the second administration of the scales, the subjects were given a full explanation of what had transpired and the purposes of the study. The experiment lasted somewhat less than an hour for each subject.

In the above design the four factors relating to effectiveness for reinforcing an individual's self-rating were held constant. To illustrate, each subject entered the experiment with approximately the same level of rated

competence and training and each subject received six reactions, hence the first factor (number of consistent reactions) was constant for all subjects. With regard to the second factor (qualification of other to evaluate) all subjects reported in the post-experimental interview that they thought their critic was an expert. According to the estimates of their speech instructors, all subjects were above the average of their classes in interest in the subject matter and in their aspirations for quality of oral reading performance, thus all subjects were similar in general motivational level. As for the fourth factor, the assistants who served as "experts" had been trained to read both the approving and disapproving evaluations with the same intensity of expression. The standardized reactions were identical in wording for all subjects, except for evaluative terms, such as good-poor, succeeded in-failed to, etc. Thus, in terms of scale values, it was assumed that the approving reaction conveyed approval to the same degree as the disapproving reaction conveyed disapproval.

FINDINGS

The initial differences between the approval and disapproval treatments for each scale are small and could have occurred more than nine times out of ten by chance (Table 1, Row B, Cols. 7–9). Therefore, any observed difference between the experimental groups in their after-ratings cannot be attributed to initial differences. Furthermore, the consistently high correlation between before and after ratings for all scales (Table 1, Row F) suggest that the rating scales are reliable as used in this experiment, and thus any significant differences in means between the two ratings can be attributed to the experimental conditions.

Hypothesis 1—Direction of Change

Considering only changes in the Criticized Scale scores, the mean change for subjects under the approval treatment are positive, and negative for disapproval subjects (Table 1, Row D, Cols. 1 and 4). An analysis of each subject's change reveals that 13 of the 15 approval subjects and 14 of the 15 disapproval subjects changed in the predicted direction. On the basis of these findings, the hypothesis that a person will rate himself closer to his ideal-self rating if he receives approval and farther away from it if he receives disapproval is considered tenable.

Hypothesis 2—Absolute Amounts of Change

If this hypothesis is acceptable, then differences between treatments in mean absolute amounts of change will not be significant at the .01 level for

TABLE 1

Changes in Self-Rating, after Approval or Disapproval, by Relation of Rating Scale to Content of Criticism

	1			2			3		
	Approval Treatment			Disapproval Treatment			Significance of Difference between Treatment Means (One Tailed "t" Test for Uncorrelated Means)		
	(1) Criticized Scale	(2) Related Scale	(3) Unrelated Scale	(4) Criticized Scale	(5) Related Scale	(6) Unrelated Scale	(7) Criticized Scale	(8) Related Scale	(9) Unrelated Scale
A. Ideal-Self Rating	2.16	2.21	2.32	2.09	2.26	2.22	ns	ns	ns
B. Actual-Self Rating: "Before" Mean Score	3.99	3.78	3.66	3.86	3.95	3.70	>.90	>.90	>.90
C. Actual-Self Rating: "After" Mean Score	3.50	3.53	3.54	5.16	4.47	3.79	<.01	<.01	ns
D. Change: Difference between "Before" and "After" Mean Scores (in scale units)	+.49	+.25	+.12	−1.30	−.52	−.09	<.01	<.05	ns
E. Level of significance of difference between "Before" and "After" Mean Scores (one tailed, "t" test for correlated means)	ns	ns	ns	<.01	ns	ns			
F. Correlation between "Before" and "After" Scale Scores (Pearson product-moment correlation coefficients)	.873*	.927*	.742*	.807*	.828*	.597**			

* Significant at .01 level.

** Significant at .05 level.

Criticized Scale scores. The results (Table 1, Row D, Cols. 1, 4, and 7) reveal that, disregarding signs, the difference is significant and the disapproval mean is two and a half times greater than the approval mean. This difference may be due to one of several factors. First, the degrees of approval and disapproval implied in the reactions of the other may not have been equal, as was initially assumed. Secondly, the observed difference may be an artifact of limitations imposed on the self-rating response by the scale. Thirdly, it is possible that approving and disapproving reactions lead to differential psychological effects, thereby producing differences in rating responses.

The assumption of equality of degrees of approval and disapproval was tested after the experiment by asking nine speech students to rate the reactions *qua* reactions for the amount of approval and disapproval implicit in them. These students, not used as experimental subjects, were asked first to read the approving reactions and then indicate how adequately they felt the person who received the reaction had performed. This was then repeated for the disapproval reactions. The mean rating assigned to the approval reactions was 1.89 or 3.11 scale units from the scale mid-point "5," and for disapproving reactions the mean rating was 7.91 or 2.91 scale units from the mid-point. By "t" test, the difference between the mean distances from the midpoint was not significant at the .01 level for 8 degrees of freedom. On the basis of this post-experimental evidence, the assumption of "objective" equality of degrees of approval and disapproval would appear to be tenable and not likely to account for the observed differences in absolute amounts of change between treatments.

A second factor which might account for the observed difference may be the relatively greater maximum amount of change possible for disapproval subjects. The maximum amount possible for subjects receiving approving reactions was 2.99 scale units, i.e., the scale distance from their initial mean to the "approval" extreme of the scale. For disapproval subjects, the maximum amount possible was 5.14 scale units. When the observed amounts of change are expressed in terms of their appropriate maximums, the disapproval subjects still changed relatively more than did the approval subjects: .253 vs. .167 of their respective maximum. All evidence considered, the hypothesis is not acceptable.

Since the correlation between the before and after ratings for both treatments is significant, the observed amounts of change must be seen as a product of the experimental conditions. In like manner, the observed differences between treatments must also be seen as the result of some systematic variation between the treatments. In part, the reaction of the other serves as an informational cue, i.e., tells the subject where the other judges him to be on the rating scale. For example, according to the ratings given the reactions by the nine speech subjects, the subjects receiving the approval treatment were in

effect "told" by the other that they had performed in a "decidedly adequate" fashion, and the disapproval subjects that they had performed "decidedly inadequately." For the approval subjects, the "expert's" reactions tend generally to confirm the self-ratings derived from their experiences in the speech class and hence changed their self-rating only slightly. However, the disapproval subjects were confronted with an appraisal of their performance which was at variance with what they had become accustomed to receiving from their speech instructor, necessitating a revision of their self-estimates. According to the "adaptation level" principle, each subject enters the experimental situation with a self-estimate which reflects past experiences tempered by the unfamiliar experimental setting. Successive self-ratings will in turn be joint products of the initial self-ratings and the subsequent stimuli, i.e., the reactions of the "expert." Following the adaptation level interpretation, shifts between before and after ratings should be proportional to the *interval* between the initially anchored scale point, (i.e., the before rating) and the "objective" scale point of the intervening stimuli. Since the "objective" scale point of the other's reactions is constant within treatments, the "adaptation level" interpretation of the observed changes of self ratings can be tested by correlating the initial self-ratings with the absolute amount of change between self-ratings. For approval subjects, the correlation coefficient is .018 and for disapproval subjects it is .863. The latter coefficient tends to support this interpretation; the higher the initial self rating the greater the amount of change resulting from disapproving reactions. The nearly zero coefficient associated with the approval treatment is not surprising, in view of the fact that the difference between the before and after mean ratings was quantitatively small and statistically not significant.

Hypothesis 3—Spread of Change between Scales

This hypothesis will be deemed acceptable if, within treatments, the amount of change for the Related Scale is *less* than the amount of change for the Criticized Scale but *more* than the change associated with the Unrelated Scale. The evidence (Table 1, Row D; Figure 1) tends to support the hypothesis.

The findings suggest that the reactions of others tend to have generalized effects upon self-ratings, but the degree of generalization diminishes as the scales become functionally dissimilar. When the data are presented in graphic form, as in Figure 1, it can be seen that the gradient of change for the disapproval treatment is steeper than the gradient for the approval treatment. No doubt this difference in steepness is due in part to marked differences in change in Criticized Scale scores; however, it does not explain why both gradients converge at the Unrelated Scale. Heider's concept "cognitive bal-

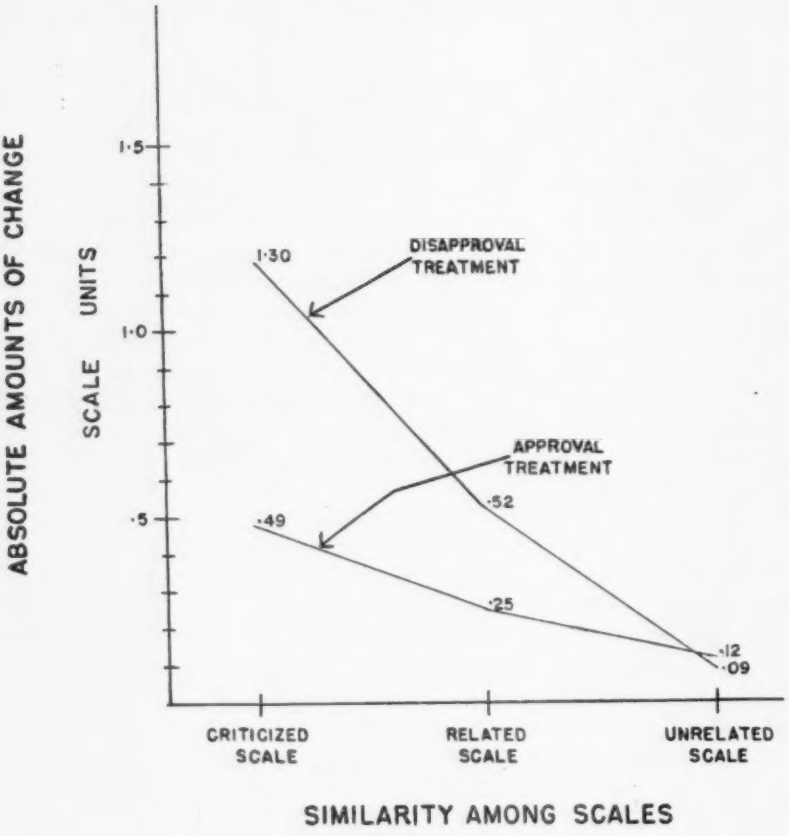

FIGURE 1

ance" (2) offers a possible explanation. When a subject is confronted with information which contradicts previously acquired information, and the information cannot readily be ignored or refuted, then the individual will incorporate the new information into his existing cognitive organization in such a way as to produce the least amount of change. Since the reactions of the other presented confirming information to the approval subjects, there is no need of isolating the other's evaluation within their total conception of themselves. The effects of negative reactions, on the other hand, seem to lead to greater discrimination between attributes of one's self-conception.

Furthermore, it is interesting to note that the relative rates of change between adjacent scales is almost identical for both treatments. For ex-

ample, when the difference between the amount of change associated with the Criticized Scale and for the Related Scale is expressed as a proportion of the total amount of change between the Criticized and Unrelated Scales, there is no difference between treatments, the percentages being 64 per cent for the approval treatment and 65 per cent for the disapproval treatment. This constant, relative rate of change suggests that the adaptation level concept applies not only to the criticized scale but equally well to functionally similar scales.

SUMMARY

The findings of this study tend to support the general view that self-conceptions are learned, and that the evaluative reactions of others play a significant part in the learning process. Observed differential effects of approval and disapproval treatments were interpreted to be a function of an interaction between the subject's initially anchored self-rating and the objective scale value of the approval or disapproval implied in the other's reaction. The findings also tend to support the hypothesis that one's self conception is an organization of discrete self-ratings which are unitized by the principle of stimulus generalization. These findings and interpretations are qualified by the fact that the number of reactions of others, the consistency of reactions within treatments, the qualifications of the other to evaluate, and the subjects' motivation were held constant.

Manuscript received: November 20, 1959
Revised Manuscript received: February 29, 1960

Richard Videbeck
Department of Sociology
University of Nebraska
Lincoln 8, Nebraska

REFERENCES

1. Cooley, C. H., *Human Nature and the Social Order*, New York: Scribners, 1902.
2. Heider, F., "Attitudes and Cognitive Organization," *Journal of Psychology*, 1946, 21, 107–112.
3. Helper, M., "Learning Theory and the Self Concept," *Journal of Abnormal and Social Psychology*, 1955, 51, 184–194.
4. Manis, M., "Social Interaction and the Self Concept," *Journal of Abnormal and Social Psychology*, 1955, 51, 362–370.
5. Mead, G. H., *Mind, Self, and Society*, Charles W. Morris, (ed.), Chicago: University of Chicago Press, 1934.
6. Miyamoto, S. F., and S. M. Dornbusch, "A Test of Interactionist Hypotheses of Self Conception," *American Journal of Sociology*, 1956, 399–403.

Direct Factor Analysis of Sociometric Data [1]

DUNCAN MACRAE, JR., *University of Chicago*

Electronic computation allows cliques or subgroups within a larger group to be separated by "direct" factor analysis of sociometric choices, followed by analytic rotation. Information on the positions of individuals within subgroups is also provided by this procedure, which is illustrated here with a group numbering 67. Existing computer routines permit extension to groups as large as 125; the principles may be extended to larger groups by additional programming.

Most previous work on the identification of cliques or subgroups has centered about the linkage structure of the larger group; proposed methods have included graph theory (9, 10, 11) and raising the sociomatrix to higher powers (17). Computer programming of these methods for large groups becomes difficult because in principle they require storage capacity that increases rapidly with the number of links in the graph, or with the power of the matrix. It has also been proposed that rows and columns of the sociomatrix be permuted so as to bring choices nearer to the main diagonal (1), but computer programming of several methods of this type has shown that they do not always reveal subgroups satisfactorily (6).

These difficulties can be circumvented by factorial examination of similarity of choices given or received by group members, a method used by Bock and Husain (2) and Gouldner (8), and discussed by Glanzer and Glaser (7). In ordinary factor analysis of sociometric data, the data storage requirement is of the order of N^2, where N is the size of the group. For "direct" factor analysis, to be described below, again only N^2 storage cells are required for data; initially the sociomatrix is stored, and at later stages it is replaced by the appropriate matrix of residuals.

The justification of this method for the identification of subgroups rests on a substantive hypothesis about the nature of subgroups and interpersonal perception. We may still consider a subgroup to be defined in terms of the

[1] Revised version of paper presented at annual meeting of the American Association for the Advancement of Science, Dec. 27, 1959. The writer is grateful to John Gagnon, of Indiana University, for supplying the data used in this analysis; to Prof. Henry F. Kaiser, of the University of Illinois, for arranging for the use of his varimax routine for processing the data on the Illiac, and to the Digital Computer Laboratory of the University of Illinois for this processing; to Frank K. Bamberger and the staff of the Operations Analysis Laboratory, University of Chicago, for aid in the initial factor analysis; to Terrance A. Nosanchuk and Walter Wallace for assistance in computation; to David L. Wallace, Fred L. Strodtbeck and Jack Sawyer for helpful suggestions; and to the Social Science Research Council for financial aid.

linkage structure of choices, following, for example, Luce and Perry (17); but we also hypothesize that, when there exist subgroups of this sort, members of any such group will tend to choose the same person and to be chosen by the same persons. Under certain additional conditions, it should be possible to infer subgroup membership from similarity in choices given and received. These conditions are that the choices show a substantial tendency toward reciprocation, and that the factors obtained be rotated to simple structure.

Certain types of sociometric questions tend to elicit reciprocal choices, and a method for measuring this tendency has been proposed by Katz and Powell (14). If we restrict ourselves to choices of this type, then we expect the common objects of choice *by* group members to be the same as the common choosers *of* group members; this will be more nearly true if each member is assigned a self-choice. More precisely, we expect this to be true only as a first approximation; discrepancies between the loadings of a person on the "chooser" and "chosen" factors for a given group can be used to indicate his status as a leader or follower, and loadings on two or more factors can indicate status as a chooser or chosen in more than one group.

It must be stressed that the notion proposed here is *not* that of a common perceptual or attitudinal space in which all participants locate one another. For many groups above 50 in size, it seems more reasonable to assume that members of each subgroup share a separate perceptual structure related to friendships, and that each subgroup will correspond to a separate dimension in the factorial space. Thus, even if attitudinal or personality characteristic A is relevant to friendship choice, there can nevertheless exist two or more groups that are similar on A yet correspond to quite separate factors. In this respect our variables differ from those dicussed by Newcomb (20) or Morton (19). Except in a small group, or in a large group polarized by conflict on some issue (5), the two-dimensional or "sociogram" representation provides far too few dimensions for an accurate description of subgroup structure.

The model proposed here is one that assumes members of one group tend to ignore other groups; the investigator then looks for an approximate partition of the sociomatrix into independent submatrices. Bock and Husain (2), however, in their use of factor analysis, did not obtain results of this kind. This is because they asked each participant to rank all others, and correlated these rankings. The result was a negative correlation between persons who did not associate with one another (e.g., boys and girls).

DIRECT FACTOR ANALYSIS

Saunders (21) has shown that a matrix X may be factor analyzed to yield a set of conjugate pairs of factors for XX' and $X'X$ (where $X'=X$ transposed). A Univac routine for performing this operation was programmed in

1956 by W. Turanski [2] and serves as the basis of the first part of our analysis.

If we wish to find the principal components of a correlation matrix, one way of doing this is by Hotelling's iterative method (12). The correlation matrix may be regarded as 1/N times the product of a matrix of row-standard scores, Z, and its transpose, Z′. Or if we let $X=Z/\sqrt{N}$, then $R=XX'$. Now if we extend Hotelling's iterative procedure so as to define a row vector v and a column vector u, and alternatively postmultiply X by v and premultiply it by u, we generate a procedure equivalent in part to the analysis of the correlation matrix.

Let u_i, v_i=the vectors u and v on the ith iteration. Then we alternately perform the operations

$$Xv_i'=u_i, \qquad [1]$$

$$u_i'X=v_{i+1}. \qquad [2]$$

Substituting [2] in [1], after transposing ($v_{i+1}'=X'u_i$) and raising i by unity in [1],

$$XX'u_i=u_{i+1}. \qquad [3]$$

This iterative procedure is equivalent to Hotelling's. It converges when u_{i+1} equals u_i multipled by a constant λ, to a desired degree of tolerance. Similarly, it can be shown that

$$v_iX'X=v_{i+1}, \qquad [4]$$

and that this converges as equation [3] converges. At convergence the elements of u and v are determined except for a multiplicative constant; u and v are conjugate principal components (eigenvectors) of XX′ and X′X respectively, and λ is the eigenvalue associated with both. The eigenvalue is

$$\lambda=N^2uN^2v, \text{ where}$$

$$N^2u=\sum_{i=1}^{r} u_i^2,$$

$$N^2v=\sum_{j=1}^{c} v_j^2,$$

i and j refer to the summations over the r rows or c columns of the vector, and "N^2" is an abbreviation for "norm-squared." After one such factoring, residuals are calculated and the procedure is repeated. This procedure, known as "deflation," leaves the remaining eigenvalues and eigenvectors unchanged (3).

In ordinary (R-type) factor analysis, little attention is paid to v, since Z is standardized by rows. In the present case, however, both sets of factors are meaningful. The variance in XX′ or X′X accounted for by a given principal component is equal to the corresponding eigenvalue (15).

[2] This work was done at Remington Rand Univac in Philadelphia. The present research made use of a revision of this routine by Frank K. Bamberger of the Operations Research Laboratory, University of Chicago.

PROCEDURE AND RESULTS

The group selected for this test consisted of 67 prison inmates, for whom sociometric choices and other data were available.[3] This group was chosen because its size was expected to permit demonstration of the procedure used, without undue expense. Location in the cell block was not a major determinant

TABLE 1

Sociometric Choices in 67-Man Group (x=chooser; y=chosen)

x	y	x	y	x	y
1	4 5	24	23 52 37	47	28 54
2	48 52 25 37	25	—	48	30 37
3	21 56 61	26	—	49	55 56 64 9
4	5	27	25 26 43 55	50	67 21 29
5	9 7 4	28	7 47 54	51	47
6	9	29	8	52	55 30 21
7	40	30	48 33 37 57 67	53	47 46 19
8	5 12 4 29 7 16 34 58	31	46 17 15 16	54	47 39 28 51 55
9	6 5 4	32	8 12 33	55	49 56 52 64
10	11 20	33	32 67	56	49 64 22 55
11	10	34	28 42	57	40
12	8 13 30 48	35	—	58	30 42 34
13	2 12	36	20 18 41	59	60 50
14	26 33	37	30 48 52 24 67 43	60	59 57
15	17 16 46	38	44	61	56 57 21 35
16	46 48	39	54 47 51 28	62	48 66 8 6 13
17	16 15	40	57 7	63	23 52 24 47 16
18	41 45 16 20	41	18 52 45 56 21	64	56 49 22
19	—	42	34 8	65	25 58
20	18 41 45	43	55 41	66	51 12 62
21	3 52	44	38 14 48	67	33 55
22	56 49 64	45	41 21 37 51		
23	24 52 37	46	15 16 17		

of interpersonal choice, as the group spent most of each day outside their cells, and a considerable portion of it together in a large room. Preliminary analysis by means of sociograms suggested that the internal structure of this group was somewhat *less* clear-cut than one would encounter in residential communities or school populations, and that it would thus constitute a good test of the method. Sociometric choices of the group are shown in Table 1.

The choices expressed by the group[4] were put on punch cards and trans-

[3] This group was under study by John Gagnon. Further analysis of the relations between subgroup structure and other variables will be presented elsewhere.

[4] The question asked was, "What fellows on the tier are you closest friends with?" This was followed, in the interview, by probes such as, "By closest friends I mean, do you associate with most frequently?"

TABLE 2

Loadings on Eleven u- *and* v-*Factors After Varimax Rotation*

Person	u's (choosers)													v's (chosens)											
No.	1	2	3	4	5	6	7	8	9	10	11	h^2	n_c	1	2	3	4	5	6	7	8	9	10	11	h^2	n_c
63	**17**	—1	2	2	6	6	—3	—3	—5	2	4	**4.5**	**6**	5	—1			1	1	—1	—1	—2	1	2	.4	1
23	**18**		1					—1				**3.3**	**4**	**14**	—1				1	—1	—1	—2		1	2.2	3
24	**18**		1					—1				**3.3**	**4**	**18**		—1	—1			1	1				3.2	4
37	**19**		—1	—2	—1	1	**10**	**8**	7		—3	**5.7**	**7**	**16**	2	—4	—1		—1	**8**	4	**11**	—3	—5	5.2	7
30	6		—4	—4	—1	1	**13**	**9**	**11**	—1	3	**4.6**	**6**	5		—2	—3			**11**	7	**10**	4	—4	3.5	6
52	7	—1	4	1	1			7	**8**	2		**1.9**	**4**	**25**	—1	5	2				5	7			7.1	9
50			—1	—1			—1	3	**11**	3	2	**1.4**	**4**	—1		—1	—1			—1	1	3	1	1	.2	2
3		—1	6				—2	—4	**12**		4	**2.2**	**4**	1		2				—2	—2	5		2	.4	2
21	6	—1	2	1			—2	—1	**8**	1	2	**1.2**	**3**	1		4	5	1	—1	—4	—2	**20**	2	3	4.8	7
67			2	—1	1		1	**12**	4		1	**1.7**	**3**	1	1	—4	—3			3	**10**	**11**	1	1	2.6	5
27	1		4	2			—2	**17**	—3			**3.1**	**5**							—1	6	—1			.3	1
43			3	7	1		—1	**10**			—1	**1.7**	**3**	3			1				**11**		—1	—1	1.4	2
14	—1		—1				1	7	1		2	**.5**	**3**							2	2		—1	1	.1	2
33		—1	—2	—2	—1		2	7	5	1	2	**.9**	**3**	—3	—1	—3	—2			4	**10**	6	3	3	1.9	5
25	1							2	—1			**.1**	**1**	3							8	—1	1	—1	.8	4
26								3	—1		1	**.1**	**1**	—1			1			—1	8	—1		1	.7	4
55	6		**19**	1	1		—1	4	2			**4.3**	**5**		1	**14**	1	6		—3	**20**	1		—1	6.6	8
56	—1		**21**		1			3	1		—1	**4.5**	**5**			**24**	2			—1	—2	**10**		3	7.0	8
22	—1		**18**	—1	—1		1	—3	2		—1	**3.3**	**4**			**12**	—1			1	—2			—1	1.5	3
49	—1	4	**19**		1			5	1	—2		**4.1**	**5**	1	1	**20**	—1			1	1			—1	4.1	5
64	—1		**18**	—1	—1		1	—3	2		—1	**3.3**	**4**	1	1	**20**	—1			1	1			—1	4.1	5
38							2			—1		**.0**	**2**							3			—1		.1	2
13		—1	1	1			6	—1	—2	5	1	**.7**	**3**	—1	—1	1	1			**12**	—1	—2	3	1	1.8	3
44	1					1	**8**	1		—2		**.8**	**4**							3			—1		.1	2
62	—1	2	2	2			**18**	—2	—3	4	2	**3.9**	**6**	—1		1	1	1		**8**	—1	—2	1		.7	2

TABLE 2—*(Continued)*

Loadings on Eleven u- *and* v-*Factors After Varimax Rotation*

Person	u's (choosers)													v's (chosens)											
No.	1	2	3	4	5	6	7	8	9	10	11	h^2	n_c	1	2	3	4	5	6	7	8	9	10	11	h^2	n_c
66	—2		1	2	4		7	—1	—1	4	—1	1.0	4	—1		1	1	1		**8**	—1	—2	1		.7	2
2	**13**				—1		**8**	3	2	—1	—2	2.5	5	2						4	1		1	—1	.2	2
48	7	1	—2	—2	—1	1	**11**	2	5		—4	2.1	3	6	1	—3	—2		3	**23**	4	6	—1	—2	6.7	8
8	1	**15**		1		6			—1	**23**	5	8.2	9	—1	1	1	2			**12**		—3	**18**	3	4.8	6
12	1	—1			—1		**17**	1		**10**		3.8	5	—1	1	1	2	1	1	**10**		—2	**14**	2	3.1	5
29							2			7	1	.6	2		3				1	—1		2	**10**	2	1.2	3
34		—1	—1	—1	5		—2		2	**8**	—3	1.1	3		2		—1	1	1	—1	—1	1	**16**	—2	2.7	5
65	1						—2	3		4	—1	.3	3							—1	1		1	—1	.0	1
42		—1					1	—1	1	**12**	—1	1.5	3		—1		—1	1	—1	—1		2	**9**	—3	1.1	3
58	2		—1	—2				1	4	**12**	—4	1.9	4	1	3		—1		1	—1	1	1	**12**	—1	1.5	3
32	—2	—1					6	4		**10**	3	1.6	4	—1	—1	—1				2	3	1	3	2	.3	2
40		2	—1		1			1	1		**14**	2.1	3	1		—1	1				1			**12**	1.5	3
57							1	1	1	—1	**10**	1.0	2			—1	—1			3	1	**8**	—2	**15**	3.2	5
35									1		1	.0	1	—1		1					—2	4		4	.3	2
59								1	2		3	.1	3									1		4	.2	2
60			—1				1	1	2	—1	**8**	.8	3									1		4	.2	2
61	—1	—1	6					—3	**14**	—1	**10**	3.4	5	—1		3				—1	—3	7		4	.9	2
19											1	.0	1	1	—1			2	1		—1	—1	—1	2	.1	2
7	1	2		1	1		—1	1	—1	1	**9**	.9	2	—2	**9**	—1	1	3	1	—1		—2	7	**13**	3.2	5
4		**12**					—1			1	—1	1.4	2	1	**21**			—1	1	—1			6	1	4.8	5
5		**18**	1		1		—1		—1	1	4	3.4	4	1	**21**			—1	1	—1			6	1	4.8	5
1		**13**					—1		1	1	—1	1.7	3		4									—1	.2	1
9		**18**	1				2	—1		—1		3.3	4	—1	**14**	4				1	1		—3	1	2.3	4
6	—1	6	1				3		—1	—3		.6	2	—1	**8**	1	1			7	—1	—1	—2	1	1.2	3
53	1	—1			7	6	1	—1	—1	—1	3	.9	4	1				2	1			—1	—1	1	.1	1

TABLE 2—*(Continued)*

Loadings on Eleven u- *and* v-*Factors After Varimax Rotation*

Person	u's (choosers)													v's (chosens)											
No.	1	2	3	4	5	6	7	8	9	10	11	h^2	n_c	1	2	3	4	5	6	7	8	9	10	11	h^2	n_c
28	1	2			**16**		—1		—1	2	5	2.8	4				—1	**19**		—1		1	2		3.7	5
39	—1				**21**		1		2		—2	4.6	5	—1				**11**			1			—1	1.2	2
47	1			—1	**15**						1	2.2	3	6	—1			**23**	3		—1	—3		4	5.9	7
51				1	**9**		1	—1	1		—1	.9	2	—2	1		3	**15**		3		4		—4	2.8	5
54	—1		3		**22**			6	1		—2	5.5	6				—1	**18**						1	3.2	4
10				5			1		—1			.3	3				2					—1			.0	2
11				1								.0	2				2					—1			.0	2
18		1	—1	**20**		6			2	1	—1	4.3	5	1		1	**19**				—1	2	1		3.5	4
20			—1	**19**					2		—1	3.6	4			—1	**16**			1		—1			2.6	4
36			—1	**16**				1	1			2.5	4				4								.2	1
41	6	—1	7	**16**		—1	—2	—2	**12**		1	4.8	6		1		**23**	1			2	5		—2	5.6	6
45	3	1	—1	**11**	4	—1	2	—1	**12**	—1	—4	3.1	5		1		**17**	1			—1	6	1	—2	3.2	4
16	2			1		**11**	6					1.7	3	6	3		5	1	**24**	1	—1	—2	**8**	2	7.3	8
15						**20**						3.8	4				—1		**18**			1		—1	3.4	4
17				1		**15**	—1			1		2.3	3				—1		**18**			1		—1	3.4	4
31	—1					**21**			1			4.4	5						5						.3	1
46						**20**						3.8	4	1				2	**19**	2			—1	1	3.6	5

Note: Loadings are multiplied by 10; resulting figures less than 1 in magnitude, after rounding, are left blank. Sum of squares of loadings=h^2; number of choices given or received, plus self-choice=n_c. Loadings of 8 or more are shown in bold-face type.

ferred to magnetic tape. They were then edited into matrix form by a routine written for this purpose.[5] At the same time, self-choices were introduced by the insertion of unity in each diagonal element of the matrix. The result may be identified with the matrix X referred to in the preceding section. Eleven pairs of conjugate eigenvectors were computed.[6] Each was normalized so that the sum of squares of its components equaled the corresponding eigenvalue; this corresponds also to Thurstone's principal-axis solution (22, p. 485). The eleven v's and the eleven u's were then rotated to orthogonal simple structure by Kaiser's varimax procedure (13). Components of the resulting factors are shown in Table 2. The order of group members has been rearranged to show the subgroup structure more clearly. The u-components represent similarities in choices given, while the v-components represent similarities in choices received.

In Table 2, the structure of u-components is generally similar to that of the v-components—a necessary condition if similarities in choices given and choices received are to constitute the basis for a single subgroup structure. Where there are discrepancies, this is most frequently related to the difference between numbers of choices given and received, as for #63 (first on the list in Table 2), who gives six choices and receives only his self-choice.

The analyst actually has a choice as to how to interpret these data, depending on whether he wishes individuals' loadings to reflect their total numbers of choices given and received. If the present system of factoring and normalization were used, if all possible factors were extracted, the sum of squares of all the u-loadings for a given person would equal the number of choices he gave, and the sum of squares of his v's, the total choices received.[7] In any

[5] This routine was written by Deane Raley, Jr.

[6] Factoring was stopped at this point for reasons of expense. The sum of squares accounted for by eleven factors was 156.2, 62 per cent of the 251 choices. It is clear that the present analysis must be extended to include questions of how many factors or components to compute. It will also be noted in Table 3 below that the sums of squares corresponding to successive factors do not always decrease as one might expect; this is probably due to approximations in stopping iteration.

[7] A proof of this result may be given for the case when XX' is of rank N, in which complete factoring would yield a square (N by N) matrix U containing all loadings on the principal components of XX'. Let $XX'U=U\Lambda$, where U is now an orthogonal matrix (sums of squares of rows and columns equal unity) and Λ is a diagonal matrix whose ith diagonal element is the ith eigenvalue of XX'. We wish to show that the diagonal elements of XX' (each of which is equal to the number of choices given by one person, when the elements of X are only zero or unity) equal the diagonal elements of $U\Lambda U'$. The ith diagonal element of $U\Lambda U'$ is equal to $\Sigma_j u_{ij}^2\lambda_j$; this is equal to the sum of squares of all loadings for individual i, normalized according to the procedure of this study. But these diagonal elements are equal, because the basic eigenvalue-eigenvector equation can be written $XX'U=U\Lambda$ (as above); and postmultiplying by U^{-1}, $XX'=U\Lambda U^{-1}=$

actual case of incomplete factoring, the total choices given or received (n_c) constitutes an upper bound to the sum of squares of factor loadings, as may be seen in Table 2. One can correct for the total number of choices given or received, therefore, by dividing each loading by the square root of the corresponding number of choices. The analyst might decide to make this adjustment for choices given, for example, but to use the loadings unaltered for choices received.

The degree to which simplicity of subgroup structure has been attained may be judged from inspection of Table 2. It is also possible to assess this simplicity by means of a criterion function computed during the varimax rotation procedure; this function has a possible range between zero and unity, and measures the extent to which the rotated configuration of factor loadings has simple structure in the normal varimax sense (13). For the present 67-man group, this function was 0.66 for both u's and v's. The corresponding figure for unrotated u's was only 0.23.

The fact that u's and v's were rotated independently to produce the data in Table 2 gives another basis for assessing the degree to which the two structures, based on choices given and received, are similar. The rotation matrices for these two varimax rotations are in fact very similar to one another, as shown in Table 3. No element in one of the transformation matrices differs from its counterpart in the other matrix by more than .13.

Table 3 also shows the sum of squares attributable to each unrotated and rotated factor. The similarity of the two rotations is again shown in these sums of squares. Whereas the sums of squares for the initial (unrotated) components show a general progressive decrease, those for the rotated components vary irregularly. Each of these values measures approximately the number of choices that can be associated with the corresponding subgroup.

The factor loadings in Table 2 have the property of "positive manifold" to a high degree; this was made possible by inversion of three factors resulting from the rotation. Such a pattern is consistent with the notion that a factor loading represents the extent to which an individual is a member of a subgroup, as either chooser or chosen. The type of sociometric data used in the analysis—positive but not negative choices—may favor this sort of subgroup configuration. The negative loadings actually obtained may reflect hostility between persons and groups, some of the smaller ones may be attributed simply to the inaccuracy of the data, or perhaps some of them would rotate to positive values, were further factors considered.

$U\Lambda U'$, since for orthogonal matrices $U^{-1}=U'$. Since the sum of squares of loadings for a given person is invariant under rotation, this result holds equally well for rotated as for unrotated loadings. The reasoning for $X'X$ would be similar to that for XX'.

TABLE 3

Rotation Matrices for u's and v's

Initial Component	Rotated Component (*u*'s) 1	2	3	4	5	6	7	8	9	10	11	Sum of Squares
1	+.52	+.23	+.27	+.20	+.21	+.34	+.36	+.21	+.31	+.34	+.08	24.6
2	+.56	−.28	−.41	−.21	−.28	−.34	+.32	+.16	+.11	−.22	−.10	18.1
3	+.10	−.23	+.72	+.12	−.01	−.40	−.22	+.10	+.29	−.33	−.05	20.6
4	+.04	−.18	−.29	+.83	−.20	+.18	−.17	−.11	+.18	−.18	−.09	15.9
5	+.19	−.35	−.15	−.11	+.77	+.25	−.18	+.02	−.08	−.33	−.07	16.1
6	+.26	−.08	+.23	−.30	−.48	+.64	−.22	−.11	−.15	−.24	−.04	15.0
7	−.40	−.59	+.19	+.04	−.06	+.22	+.61	+.04	−.05	+.06	−.16	11.8
8	−.36	+.05	−.21	−.22	−.06	+.21	−.08	+.46	+.63	−.21	+.25	9.8
9	−.06	+.29	+.04	+.15	−.02	+.03	+.02	+.68	−.40	−.22	−.46	9.3
10	+.08	−.44	−.05	−.05	−.08	−.02	−.48	+.35	−.00	+.65	−.12	8.5
11	−.07	+.16	−.04	+.18	+.05	+.04	−.04	−.29	+.43	+.09	−.81	6.6
Sum of squares	17.8	12.5	20.2	14.9	16.8	16.9	13.8	10.3	12.3	12.7	7.8	
	Rotated Component (*v*'s)											
1	+.49	+.23	+.23	+.19	+.22	+.32	+.38	+.27	+.37	+.33	+.05	
2	+.44	−.27	**−.45**	**−.22**	**−.29**	−.37	+.30	+.21	+.24	−.24	−.13	
3	+.08	−.20	+.72	+.11	−.00	−.38	−.24	+.14	+.29	−.34	−.04	
4	+.05	−.17	−.27	+.84	−.19	+.18	−.19	−.12	+.17	−.16	−.11	
5	+.23	−.33	−.17	−.11	+.76	+.25	−.19	+.02	−.08	−.35	−.05	
6	+.30	−.07	+.20	−.30	−.50	+.64	−.20	−.05	−.11	−.24	−.06	
7	−.41	−.59	+.20	+.04	−.03	+.23	+.60	+.03	−.04	+.01	−.15	
8	−.47	+.06	−.21	−.17	−.02	+.24	−.17	+.37	+.60	−.16	+.30	
9	−.13	+.29	−.02	+.14	−.01	+.04	+.02	+.71	−.38	−.21	−.43	
10	+.07	−.46	−.05	−.06	−.07	−.03	−.45	+.34	−.03	+.66	−.12	
11	−.13	+.17	−.02	−.18	+.09	+.05	−.08	−.30	+.40	+.10	−.80	
Sum of squares	16.0	12.8	18.8	15.6	16.2	16.8	14.4	10.9	12.9	13.7	8.0	

CONCLUSIONS

These results show that clear-cut subgroups can be identified within a larger group by a computer procedure involving no subjective elements such as are involved in the construction of sociograms or graphical rotation of factors. The principal evidence for the clarity of subgroup structure consists of the rotated factor loadings in Table 2, together with the varimax criterion function. The accuracy with which leaders and followers in the eleven subgroups have been identified rests on comparison of the data in Table 2 with those in Table 1. More detailed evaluation of the method would be possible if it were compared with other methods on the same data. This line of argument could be elaborated further, but it should be clear that it depends on nothing but the sociometric data themselves.

A more fundamental test of the adequacy of this procedure would result from its use in testing hypotheses relating subgroup structure to other variables. This is not attempted here, however, because the hypotheses we should like to test are not yet well subtantiated and it is believed that clarity of subgroup structure itself should be relevant (if less fundamental) evidence. Homophily, as defined by Lazarsfeld and Merton (16), might seem worth investigating; but we are *not* concerned with homophily as an ultimate criterion for defining subgroups, and the relative absence of homophily on any given status or value criterion would not invalidate the method. Examination of group processes such as subgroup polarization seems to be among the best ultimate tests of subgroup delineation (18).

Even though the main lines of a widely applicable procedure for identifying subgroups have been specified here, certain questions remain before this method can be standardized. Criteria for stopping factoring must be invoked. Oblique rotation must be considered. A decision must be made about how to treat factor loadings as influenced by individual differences in numbers of choices given and received, and alternative methods of normalization of eigenvector components must be evaluated. Standard measures of "leadership," "followership," and related variables must be devised, based on comparison of u's with corresponding v's. It is hoped that communication among researchers will permit steps of this kind to be taken, so that an objectively based comparative study of social networks can be developed. Such a study will permit the exploitation of vast amounts of sociometric data stored in researchers' files, and provide a solid foundation for the dynamic study of subgroup functioning in decision and communication processes.

Manuscript received: February 24, 1960

Duncan MacRae, Jr.
Department of Political Science
University of Chicago
Chicago 37, Illinois

REFERENCES

1. Beum, C. O., and E. G. Brundage, "A Method for Analyzing the Sociomatrix," *Sociometry*, 1950, 13, 141–145.
2. Bock, R. D., and S. Z. Husain, "Factors of the Tele: A Preliminary Report," *Sociometry*, 1952, 15, 206–219.
3. Bodewig, E., *Matrix Calculus* (Rev. Ed. 1959), New York: Interscience Publishers, 1959.
4. Cattell, R. B., *Factor Analysis*, New York: Harper, 1952.
5. Coleman, J. S., *Community Conflict*, Glencoe, Illinois: The Free Press, 1957.
6. Coleman, J. S., and D. MacRae, Jr. "Electronic Processing of Sociometric Data for Groups up to 1000 in Size," *American Sociological Review*, 1960, 25, 722–727.
7. Glanzer, M., and R. Glaser, "Techniques for the Study of Group Structure and Behavior: I. Analysis of Structure," *Psychological Bulletin*, 1959, 56, 317–332.
8. Gouldner, A. W., "Cosmopolitans and Locals: Toward an Analysis of Latent Social Roles—II," *Administrative Science Quarterly*, 1958, 2, 444–480.
9. Harary, F., and R. Z. Norman, *Graph Theory as a Mathematical Model in Social Science*, Ann Arbor, Mich.: Institute for Social Research, 1953.
10. Harary, F., and I. C. Ross, "A Procedure for Clique Detection Using the Group Matrix," *Sociometry*, 1957, 20, 205–215.
11. Harary, F., "On the Measurement of Structural Balance," *Behavioral Science*, 1959, 4, 316–323.
12. Hotelling, H., "Analysis of a Complex of Statistical Variables into Principal Components," *Journal of Educational Psychology*, 1933, 24, 417–441, 498–520.
13. Kaiser, H. F., "The Varimax Criterion for Analytic Rotation in Factor Analysis," *Psychometrika*, 1958, 23, 187–200.
14. Katz, L., and J. H. Powell, "Measurement of the Tendency Toward Reciprocation of Choice," *Sociometry*, 1955, 18, 659–665.
15. Kendall, M. G., *A Course in Multivariate Analysis*, London: Griffin, 1957.
16. Lazarsfeld, P. F., and R. K. Merton, "Friendship as Social Process: A Substantive and Methodological Analysis," in M. Berger, T. Abel, and C. H. Page (eds.), *Freedom and Control in Modern Society*, New York: Van Nostrand, 1954.
17. Luce, R. D., and A. D. Perry, "A Method of Matrix Analysis of Group Structure," *Psychometrika*, 1949, 14, 95–116.
18. MacRae, D., Jr., and D. M. Kilpatrick, "Collective Decision and Polarization in a 125-Man Group," *Public Opinion Quarterly*, 1959, 23, 505–514.
19. Morton, A. S., "Similarity as a Determinant of Friendship: A Multi-Dimensional Study," Ph.D. thesis, Princeton University, 1959 (Princeton; N. J.: Educational Testing Service).
20. Newcomb, T. M., "The Cognition of Persons as Cognizers," in R. Tagiuri and L. Petrullo, *Person Perception and Interpersonal Behavior*, Stanford, Calif.: Stanford University Press, 1958.
21. Saunders, D. R., "Practical Methods in the Direct Factor Analysis of Psychological Score Matrices," Ph.D. thesis, University of Illinois, 1950; Ann Arbor, Mich.: University Microfilms.
22. Thurstone, L. L., *Multiple-Factor Analysis*, Chicago: University of Chicago Press, 1947.

Social Class and the Allocation of Parental Responsibilities [1]

MELVIN L. KOHN AND ELEANOR E. CARROLL

National Institute of Mental Health

The purpose of this paper is to trace the effects of middle- and working-class parents' ideologies of child rearing upon the division, between mother and father, of responsibilities for the support and constraint of the children.

Our previous research has shown decidedly different emphases in middle- and working-class parents' values for their children. According to these studies, the dominant motif of middle-class parents' values is that the child develop his own standards of conduct: desirable behavior consists essentially in the child's acting according to the dictates of his own principles. By contrast, the dominant motif of working-class parents' values is that the child's actions be reputable: desirable behavior consists essentially in his not transgressing parental proscriptions (7). Faced with the decision of whether or not to punish a child's misbehavior, middle-class parents look to the child's motives and feelings. Working-class parents look, instead, to the act itself; their attention is focused on the direct consequences of misbehavior (8). The middle-class child is more apt to be punished for loss of self-control, the working-class child for disobedience.

We assume that inherent in parents' standards *for* their children are conceptions of their *own* responsibilities as parents. Specifically, it seems to us that middle-class values imply a parental obligation to be sensitive to the child's thoughts and feelings; working-class values imply a parental obligation to make clear to the child what rules are to be obeyed. We should therefore expect the ratio of support to constraint in parents' handling of their children to be higher in middle- than in working-class families. Bronfenbrenner's recent review of the past 25 years' research on parent-child relationships strengthens this expectation: "Over the entire . . . period studied, parent-child relationships in the middle class are consistently reported as more acceptant and equalitarian, while those in the working class are oriented toward maintaining order and obedience. Within this context, the middle class has shown a shift away from emotional control toward freer expression

[1] This is the third report of an inquiry into the relationship of class and family directed by the senior author and John A. Clausen, with the collaboration and aid of Eleanor E. Carroll, Mary K. Foreshew, Mary Freeman, Paul F. Hanlon, Elizabeth Howell, Jay Kenvin, Jonathan Wallach and Eleanor Wolff. Expert advice on sample design and statistical problems was generously provided by Samuel W. Greenhouse. The interviews were conducted during the period March 1956 to March 1957.

of affection and greater tolerance of the child's impulses and desires." (2, p. 425).

Whatever the relative weight parents may give to support and constraint, the process of child rearing obviously requires both. Responsibilities for support and constraint can be apportioned between mother and father, however, in any of several ways. The father's role, in particular, is potentially quite variable. From what we know of their own and their wives' ideologies, we should expect middle-class fathers to play a much larger part in providing support to the children than do working-class fathers. It would seem more appropriate to working-class ideology that the father's role center on the imposition of constraints.

There has been little empirical work on social class and the division of parental responsibilities. The authors of two of the best-known studies of social class and family relationships tell us only that there is no difference between middle- and working-class families in the extent to which fathers are involved in child rearing (6, p. 441 and 9, p. 395) and most other studies of class and family tell us nothing directly pertinent to this question. There is some evidence, however, that middle-class fathers devote more time to child rearing (4, 13), play a larger part in disciplining the children (1) and have "warmer" relationships with the children (11). Whether or not parental responsibilities are differently allocated in middle- and working-class families is still far from clear.

SAMPLE, METHODS OF DATA COLLECTION, AND PRINCIPAL INDICES

Washington, D. C.—the locus of this study—has a large proportion of people employed by government, relatively little heavy industry, few recent immigrants, a white working class drawn heavily from rural areas, and a large proportion of Negroes, particularly at lower economic levels. Generalizations based on this or any other sample of one city during one limited period of time are, of course, tentative.

Our intent in selecting the families to be studied was to secure approximately 200 representative white working-class families and another 200 representative white middle-class families, each family having a child within a narrowly delimited age range. We decided on fifth-grade children, because we wanted to direct the interviews to relationships involving a child old enough (approximately ten or eleven years old) to have a developed capacity for verbal communication.

The sampling procedure involved two steps: the first, selection of Census tracts. Tracts with 20 per cent or more Negro population were excluded, as were those in the highest quartile with respect to median income. From among the remaining tracts we then selected four with a predominantly

working-class population, four predominantly middle-class, and three having large proportions of each. The final selection of tracts was based on their occupational distribution and their median income, education, rent (of rented homes), and value (of owner-occupied homes). The second step in the sampling procedure was the selection of families. From records made available by the public and parochial school systems, we compiled lists of all fifth-grade children of families who lived in the selected tracts. Two hundred families were then randomly selected from among those in which the father had a "white-collar" occupation and another 200 were from among those in which the father had a manual occupation.

In all 400 families, the mother was to be interviewed. In every fourth family we scheduled interviews with the father and the fifth-grade child as well. (When a broken family fell into this sub-sample, a substitute was chosen from our overall sample, and the broken family was retained in the overall sample. The present analysis, however, will be limited to intact families.)

When interviews with both parents were scheduled, two members of the staff visited the home together—a man to interview the father, a woman to interview the mother. The interviews were conducted independently in separate rooms, but with essentially identical schedules. The first person to complete his interview with a parent interviewed the child.

We secured the cooperation of 86 per cent of the families where the mother alone was to be interviewed, and 82 per cent of the families where mother, father, and child were to be interviewed. Rates of non-response do not vary appreciably by social class, type of neighborhood, or type of school. This, of course, does not rule out other possible selective biases introduced by the non-respondents.

Index of Social Class

Each family's social class position was determined by the Hollingshead Index of Social Position, assigning the father's occupational status a relative weight of 7 and his educational status a weight of 4. We are considering Hollingshead's Classes I, II, and III to be "middle class," and Classes IV and V to be "working class." The middle-class sample is composed of two relatively distinct groups: Classes I and II are almost entirely professionals, proprietors and managers with at least some college training. Class III is made up of small shopkeepers, clerks, and salespersons, but includes a small number of foremen and skilled workers of unusually high educational status. The working-class sample is composed entirely of manual workers but preponderantly those of higher skill levels. These families are of the "stable working class" rather than of the "lower class" in the sense that the men have steady jobs, and

their education, income, and skill levels are above those of the lowest socio-economic strata.

Index of Support

Two apparently distinct issues are involved in measuring assessments of how the father's relationship to the child compares to the mother's along the axis we are calling "support": Which *parent* is the more encouraging of the child? To which parent does the *child* turn for advice and reassurance? In developing an index, we thought it likely that neither parents nor children would think that the child turns to one parent in preference to the other unless they consider that parent to be the more encouraging. This expectation was put to empirical test by choosing two questions of each type and determining whether answers to the set of four fall along a single dimension (on the model of the Guttman scale). The four questions, in the form in which they were asked of mothers, are:

1. "What do you usually do when (the fifth-grade child) does something that pleases you?" "What does your husband do when (child) does something that pleases him?" (Answers were classified according to whether or not the parent encourages the child.)
2. "Can you tell me whether you or your husband is quicker to praise (child) for the things he does well—or would you say that you are both equally quick to praise him or that neither is quick to praise him?"
3. "Which parent is (child) more likely to feel he can talk things over with?"
4. "To whom does (child) turn when he's troubled or unhappy—or doesn't he turn to anyone in particular?"

Few parents or children said that the father is *more* encouraging of the child than is the mother, or that the child turns to his father *more* readily than to his mother. Therefore, we dichotomized answers to the first two questions according to whether or not the respondent thought the father to be *as* encouraging as the mother, and answers to the third and fourth questions according to whether or not the child is thought to turn to his father *as* readily as to his mother.

Considered this way, mothers' answers do fall along a single dimension: reproducibility (14) is 96 per cent, scalability (10) is 0.84, and in all other relevant respects (5) the pattern of answers is a close approximation to the model of a perfect unidimensional scale. Our samples of 82 fathers and children do not meet the conventional requirement that one employ at least 100 cases in testing for unidimensionality, but the patterns of answers are quite similar to that for mothers' responses. (Reproducibility for fathers' responses

is 93 per cent, for children's 89 per cent.) Thus it seems reasonable to treat fathers' and children's responses, too, as unidimensional.

Almost no one thinks the child turns to his father as readily as to his mother unless he feels that the father is as encouraging as the mother. A respondent's answers to the set of four questions can thus be thought of as indicating:

Scale Score	Meaning
3–4	Father is as encouraging of the child as is mother, and the child turns to him as readily as to mother.
2	Father is as encouraging as mother, but the child does not turn to him as readily as to mother.
0–1	Father is not as encouraging as mother, and the child does not turn to him as readily as to mother.

The scale questions deliberately do not specify when and for what a parent encourages the child, when and for what the child turns to the parent. For example, the first question considers the parent's response when pleased by the child's actions, regardless of what pleases him. Middle-class parents, as we would expect from knowing their ideology, are apt to be pleased by the child's personal accomplishments, working-class parents by his obedience.[2] For purposes of scale construction, though certainly not for purposes of interpretation, this was deemed irrelevant.

One final consideration is that, for most of our respondents, the child's turning to his father as readily as to his mother is roughly equivalent to saying that the child is as "close" to his father as to his mother. That is, scale scores correlate highly with both middle- and working-class parents' and children's answers to our further question, "To which parent would you say (child) feels closer?"

Index of Constraint

Our measure here is an index of the relative parts played by mother and father in setting limits upon the child's freedom of movement or activity. We asked each parent: "Can you tell me whether you or your husband (wife) is *stricter* toward (the fifth-grade child)—or would you say that you are both equally strict, or that neither is strict?" In three later questions we substituted for "stricter" the expressions, "more likely to lay down the law when (child) misbehaves," "more likely to dominate (child)," and "more likely to restrict (child's) freedom." To summarize these data, each of these questions was scored zero if the mother was said to exceed the father, one if the parents were said to be equal, and two if the father was said to exceed

[2] The criterion of statistical significance used throughout this paper is the five per cent level.

the mother. A parent's answers to the set of four questions could thus be scored from zero (mother predominates in setting limits for the child) to eight (father predominates).

This index does not meet our criteria for a unidimensional scale; its justification is its serviceability as an approximate measure of the part played by each parent in setting limits for the specific child.

RESULTS

Support and Constraint of Sons

Middle-class mothers are more likely than are working-class mothers to feel that the son turns to his father as readily as to his mother (see Table 1). This is true for the wives of small shopkeepers, clerks, and salesmen, as well as for the wives of professionals, proprietors and managers. It holds even when each of a number of other relevant variables is controlled, e.g. size of the family, the age, religion, rural or urban background, and social mobility of each parent, family income, the socio-economic status of the neighborhood in which the family lives, the type of enterprise in which the father is employed, the mother's education, whether or not she has a job outside the home and, if so, what type of job, her social class identification, and whether or not she reads popular literature on child rearing.

Middle-class fathers and sons, too, are more likely than are working-class fathers and sons to feel that the son turns to father as readily as to mother (Table 1). Furthermore, in two-fifths of the middle-class families, mother, father, and son *all* think the son turns to father; in *no* working-class family is this the case. Thus, when working-class parents say the son turns to his father, the son disagrees; and when the son says he does, the parents feel otherwise.

Why are working-class parents and sons relatively unlikely to think that the son turns to his father as readily as to his mother?

So far as working-class *mothers* are concerned, it is largely because many do not think their husbands are as encouraging as themselves (Scale Scores 0–1). To understand why this is so, we must take into account the father's role in limit-setting and whether or not he openly expresses affection to the children.

There is little or no difference between middle- and working-class parents' assessments of how large a part the father plays in setting limits for the children. But in families where the father is said to play the *predominant* part in setting limits for a son, working-class mothers are just as likely as are middle-class mothers to feel that the father is as encouraging as the mother; in families where the *mother* is said to play the predominant part in

TABLE 1

Assessments of Supportiveness Made by Mothers, Fathers, and Children, by Social Class (Proportions)

Index of Support	Scale Score	Reports by Mothers: Middle Class	Mothers: Working Class	Fathers: Middle Class	Fathers: Working Class	Children: Middle Class	Children: Working Class
Son turns to father as readily as to mother	4	.22	.11	.32 *	.24	.48 *	.08
	3	.29	.18	.32	.12	.20	.16
Son does not turn to father, although father is as encouraging as mother	2	.29	.32	.16	.36	.20	.40
Father is not as encouraging of the son as is mother	1	.15 *	.18	.12	.20	.12 *	.24
	0	.05	.21	.08	.08	.00	.12
		1.00	1.00	1.00	1.00	1.00	1.00
Number of cases		(82)	(73)	(25)	(25)	(25)	(25)
Daughter turns to father as readily as to mother	4	.25	.18	.14	.00	.05	.09
	3	.12	.10	.05	.09	.10	.09
Daughter does not turn to father, although father is as encouraging as mother	2	.41	.46	.38	.64	.47	.73
Father is not as encouraging of the daughter as is mother	1	.12	.21	.38	.27	.14	.09
	0	.10	.05	.05	.00	.24	.00
		1.00	1.00	1.00	1.00	1.00	1.00
Number of cases		(81)	(73)	(21)	(11)	(21)	(11)

* Difference statistically significant, .05 level or better, t-test for the difference between two proportions.

Note: Eleven middle-class and nineteen working-class families in which mother and father were not living together at the time of the interviews have been excluded from this and all subsequent tables.

TABLE 2

Mothers' Assessments of Supportiveness, by Their Assessments of Limit-Setting, by Social Class (Proportions)

Index of Support	Limits Set Primarily by[a]					
	Father		Both Equally		Mother	
	Middle Class	Working Class	Middle Class	Working Class	Middle Class	Working Class
A. Sons						
1. Father is as encouraging as mother (Scale Scores 2–4).	.68	.71	.79	.67	.93 *	.50
2. Son turns to father as readily as to mother:						
(a) where father is thought to be as encouraging as mother (Scale Scores 3–4 as a proportion of Scores 2–4)	.74	.50	.63	.50	.57	.38
(b) in all families (Scale Scores 3–4 as a proportion of all cases)	.50	.35	.50	.33	.53 *	.19
Number of cases	(28)	(17)	(24)	(30)	(30)	(26)
B. Daughters						
3. Father is as encouraging as mother (Scale Scores 2–4)	.55	.67	.93	.68	.81	.88
4. Daughter turns to father as readily as to mother:						
(a) where father is thought to be as encouraging as mother (Scale Scores 3–4 as a proportion of Scores 2–4)	.33	.14	.52	.47	.50	.43
(b) in all families (Scale Scores 3–4 as a proportion of all cases)	.18	.10	.48	.32	.41	.38
Number of cases	(22)	(21)	(27)	(28)	(32)	(24)

* Difference statistically significant, .05 level or better, t-test for the difference between two proportions.

[a] Scores on the index of limit-setting have been trichotomized as follows: 0–2=mother predominates, 3–5=parents play approximately equal parts in setting limits, 6–8=father predominates.

limit-setting, working-class mothers are far less likely than are middle-class mothers to think that the father is as encouraging as the mother (see Table 2, line 1). Middle-class mothers are more likely to consider the father encouraging of his son if they think he does *not* play a major part in limit-setting,[3] while working-class mothers are more likely to consider him encouraging if they think he *does* play a major part in limit-setting.

Even more important for working-class mothers' appraisals of encouragement are their judgments of whether or not the father openly "shows affection" to the children (see Table 3, line 3). (This seems to matter much less for middle-class mothers' appraisals—Table 3, line 1.) A working-class mother is *most* likely to consider the father encouraging if he both plays a major part in limit-setting and is affectionate; she is somewhat less likely to consider him encouraging if he is affectionate but does not play much part in limit-setting; and is quite unlikely to consider him encouraging if he is not affectionate, even if he does set limits.

Father's being affectionate is of crucial importance for working-class mothers' appraisals of whether or not he is encouraging, with his role in limit-setting having secondary importance. *If* he is deemed encouraging, however, his role in limit-setting assumes primary importance for his wife's judgment of whether or not the son turns to him (Table 3, line 4a).[4] The cumulative result (Table 3, line 4b) is that half of the working-class mothers who say that the father both plays a major part in limit-setting and is affectionate think the son turns to him for advice and reassurance—a proportion roughly equal to that for middle-class mothers. But under any other conditions, less than a fifth of the working-class mothers think the son turns to his father as readily as to his mother. Since a substantial majority of working-class mothers believe that their husbands either are not affectionate to the children, or do not play a major part in limit-setting, or both, few think the son does turn to his father.

[3] The negative relationship between assessments of the father's encouragment and his playing a major part in limit-setting holds most strongly for the least experienced and least self-assured middle-class mothers: the younger mothers, those for whom the boy in question is their first-born, those who seek advice on child rearing from the popular literature, and those who say they are less sure of themselves in dealing with the boy than are their husbands. For more experienced and self-assured middle-class mothers, the father's role in limit-setting is at most only slightly related to judgments of how encouraging he is.

[4] So far as can be ascertained from relatively few cases, limit-setting is relatively less important, affection relatively more important, for Catholic than for Protestant working-class mothers' assessments of whether or not the son turns to his father as readily as to his mother. This appears to be especially so where the son attends parochial school. We suspect that these mothers see less necessity for the father to set limits for the son, for the parochial school assumes much of this responsibility.

TABLE 3

Mothers' Assessments of Supportiveness, by Their Assessments of Limit-Setting and of Father's Affection (Proportions)

Index of Support	Mother Says That Father "Displays Affection"[a]		Mother Says That Father Is "Reserved"	
	Limits Set Primarily by[b]			
	Father	Mother	Father	Mother
A. Middle Class (Sons only)				
1. Father is as encouraging as mother (Scale Scores 2–4)	.72 *	.97	.60	.85
2. Son turns to father as readily as to mother:				
(a) where father is thought to be as encouraging as mother (Scale Scores 3–4 as a proportion of Scores 2–4)	.72	.61	.56	.64
(b) in all families (Scale Scores 3–4 as a proportion of all cases)	.52	.59	.33	.54
Number of cases	(25)	(29)	(15)	(13)
B. Working Class (Sons only)				
3. Father is as encouraging as mother (Scale Scores 2–4)	.79	.64	.38	.29
4. Son turns to father as readily as to mother:				
(a) where father is thought to be as encouraging as mother (Scale Scores 3–4 as a proportion of Scores 2–4)	.64 *	.25	.40	...[c]
(b) in all families (Scale Scores 3–4 as a proportion of all cases)	.50 *	.16	.15	.14
Number of cases	(28)	(25)	(13)	(7)

* Difference statistically significant, .05 level or better, t-test for the difference between two proportions or, where N's are small, the exact combinatorial test.

[a] We asked, "Would you say that you and your husband show a good deal of affection toward the children, or are you more reserved about showing affection to them?" and then inquired further specifically about *father's* showing affection. This classification is based only on what the mother said about her husband.

[b] Scores on the index of limit-setting have been dichotomized as follows: 0–3=mother predominates, 4–8=father predominates.

[c] Proportion not shown because N is only 2. One of these 2 mothers thought the son does turn to father.

Does the father's playing a constraining role really matter for working-class mothers' assessments of the son's inclination to turn to him? Or is it simply that those working-class fathers who take sufficient interest in their sons for the mother to feel that the son turns to his father are apt to play a constraining role? Certainly, working-class fathers tend to be less involved in activities with their children than are middle-class fathers: despite the fact that fewer working- than middle-class fathers say they work away from home on frequent evenings and weekends (22 per cent *vs.* 48 per cent), working-class fathers are less likely than are middle-class fathers to relieve their wives of the burdens of caring for the children around the clock (61 per cent *vs.* 93 per cent) or to participate at all extensively in leisure-time activities with the children (78 per cent *vs.* 93 per cent).

To middle-class mothers, the father's not participating in activities with the children would almost preclude the son's turning to him: only five middle-class mothers said that their husbands do not engage in a range of leisure-time activities with the children, but these five included three of the four who judged their husbands to be extremely unencouraging (Scale Type 0) of the son. Father's participation or lack of participation in leisure-time activities with the children, however, is irrelevant to working-class mothers' assessments. Rather, we suggest that the working-class father's role in setting limits for the son is of crucial import for his wife's appraisal, not because limit-setting is the only part the father is likely to take in child rearing, but because working-class ideology assigns to limit-setting a strategic importance.

Working-class *sons* could hardly be expected to share this evaluation of limit-setting; they don't. The son is more likely to feel that he can turn to his father as readily as to his mother if the father does *not* play as large a part in setting limits for him as the mother does (see Table 4). This is why working-class sons assess their relationships with their fathers so very differently from their parents: of 25 working-class families in which we interviewed mother, father, and son, there were five where the parents thought the son turns to his father as readily as to his mother, but the son said he does not. In four of them the father indicated he plays a major part in limit-setting. In another five families the son said he does turn to his father, but the parents disputed this. In four of these five, the father indicated he does *not* play much part in limit-setting. For working-class *parents,* the father's playing a major part in limit-setting is necessary if the son is to turn to him for advice and reassurance; for working-class *sons,* it precludes such a relationship.

Conceptions of Mothers' and Fathers' Proper Roles vis-à-vis Sons

What responsibilities do working-class mothers *want* their husbands to assume? And what do working-class fathers consider their obligations toward their sons to be?

TABLE 4

Consistency of Mothers', Fathers', and Children's Assessments of Whether or Not the Child Turns to Father as Readily as to Mother, by Fathers' Assessments of Limit-Setting

	With Respect to Sons				With Respect to Daughters			
	Middle Class		Working Class		Middle Class		Working Class	
	Limits Set Primarily by[a]							
	Father	Mother	Father	Mother	Father	Mother	Father	Mother
Number of families in which the child is thought to turn to father as readily as to mother:								
A. By mother, father and child	4	6	0	0	0	0	0	0
B. By mother and father, but not child	1	2	4	1	3	1	0	0
C. By mother and child, but not father	0	1	0	0	0	0	0	0
D. By father and child, but not mother	1	2	0	1	0	0	0	0
E. Only by mother	0	1	0	0	1	3	4	1
F. Only by father	0	0	1	2	0	0	1	0
G. Only by child	2	1	1	4	0	3	2	0
H. By no one	4	0	6	5	6	4	2	1
Total	12	13	12	13	10	11	9	2

[a] Scores on the index of limit-setting have been dichotomized as follows: 0–3=mother predominates, 4–8=father predominates. This table is based on fathers' assessments of limit-setting; the results are virtually identical when mothers' assessments are used.

TABLE 5

Proportion of Middle- and Working-Class Mothers Who Made Spontaneous Comments, Critical of Their Husbands' Performance as Fathers, by Their Assessments of Limit-Setting and Supportiveness

	Number of Cases				Proportion Who Made Critical Comments About Husband's Performance			
	Middle Class		Working Class		Middle Class		Working Class	
	Limits Set Primarily by [a]							
	Father	Mother	Father	Mother	Father	Mother	Father	Mother
Mother's Assessment of Supportiveness:								
Son turns to father as readily as to mother	18	24	16	5	.06	.08	.19	.40
Son does not turn to father, although father is as encouraging as mother	9	15	11	13	.11	.33	.09	.31
Father is not as encouraging of the son as is mother	13	3	14	14	.38	... [b]	.57	.57
Daughter turns to father as readily as to mother	13	17	9	11	.08	.06	.11	.27
Daughter does not turn to father, although father is as encouraging as mother	18	15	18	16	.22	.20	.06	.38
Father is not as encouraging of the daughter as is mother	12	6	13	6	.42	.33	.31	.33

[a] Scores on the index of limit-setting have been dichotomized as follows: 0–3=mother predominates, 4–8=father predominates.

[b] Proportion not shown because N is only 3. Two of these three mothers were critical of their husbands.

Working-class mothers (as do middle-class mothers) deem it extremely important that the father be as encouraging of the son as is the mother herself: over half of those who do not think that their husbands are this encouraging made spontaneous comments, during the course of the interview, critical of their husbands' performance as fathers (see Table 5). This was true whether or not the mothers said that their husbands play a major part in limit-setting. *Given* the father's being encouraging, however, his role in limit-setting assumes predominant importance. In the exceptional case where a working-class mother thinks the son turns to his father despite the latter's not playing a major part in limit-setting, she is still apt to be critical of him. But few working-class mothers are critical of husbands who both encourage the son and set limits for him—whether or not they think that the son turns to his father. Working-class mothers do not value a highly supportive father-son relationship, but rather a directive one, in which the father, by an admixture of encouragement and constraint, guides the son. (To middle-class mothers, on the other hand, a highly supportive father-son relationship is at least as important as the father's playing a constraining role.)

Despite their wives' dissatisfactions, most working-class fathers are satisfied with the present allocation of parental responsibilities. We asked each parent, "Are there any ways you'd rather act differently toward (the fifth-grade child) from the way you do?" and "Are there any ways you'd rather your wife (or husband) acted differently . . .?" Working-class fathers were notably unlikely to say there were *any* ways they'd prefer to act differently or to have their wives act differently (see Table 6). (Middle-class fathers were likely to say they'd rather both they and their wives were more understanding, patient, and attentive to the son.)

Working-class fathers do not play the role their wives would have them play; nor do they see any reason why they should. Rather, we would suggest, they see child rearing as more completely their wives' responsibility.[5] Their wives decry this attitude (many of them saying that the father shirks his responsibilities) and want their husbands to play a more active part, along both the constraint and support axes.

Mothers' and Fathers' Roles vis-à-vis Daughters in Middle-Class Families

More than a third of the middle-class mothers believe that the daughter turns to her father for advice and reassurance as readily as to her mother,

[5] When asked what they find most difficult about being a father, working-class fathers were more apt to talk of the problems of meeting the family's financial needs, middle-class fathers of the physical and emotional strain entailed in raising children. (It is noteworthy that the wives of those middle-class fathers who emphasized the strain of child rearing were even more likely than were other middle-class mothers to report that the child turns to his father as readily as to his mother.)

TABLE 6

Proportion of Middle- and Working-Class Fathers Who Say They'd "Rather Act Differently" and Would Rather Their Wives "Acted Differently" Toward the Child

	With Reference to Sons			With Reference to Daughters	
	Middle Class		Working Class	Middle Class	Working Class
Would prefer to act differently:					
More understanding, patience, attention	.36	*	.04	.28	.18
More affection	.04		.16	.10	.09
More discipline	.04		.08	.10	.09
Less discipline	.12		.04	.00	.00
Other changes desired	.04		.00	.05	.00
No changes desired	.40	*	.68	.47	.64
	1.00		1.00	1.00	1.00
Number of cases	(25)		(25)	(21)	(11)
Would prefer wife to act differently:					
More understanding, patience, attention	.36	*	.08	.05	.09
More affection	.00		.00	.00	.00
More discipline	.16		.16	.19	.18
Less discipline	.00		.08	.05	.00
Other changes desired	.16		.00	.05	.00
No changes desired	.32	*	.68	.66	.73
	1.00		1.00	1.00	1.00
Number of cases	(25)		(25)	(21)	(11)

* Difference statistically significant, .05 level or better, t-test for the difference between two proportions.

but even that sizeable minority is smaller than the proportion of middle-class mothers who believe that the son turns to his father (Table 1). It is not, however, that middle-class mothers are any less likely to think that fathers are encouraging of daughters than of sons. Nor is it that they deem it inappropriate for a daughter to turn to her father (Table 5). In fact, middle-class mothers are least likely to be critical of their husbands when they feel that the daughter turns to her father as readily as to her mother; the father's role in setting limits for the girl matters little.

It appears, however, that, from the mother's point of view, the daughter is unlikely to turn to her father if he plays a predominant part in limit-setting. The optimum situation is for him to play a part equal to his wife's (Table 2, line 4b).

The point at which the difference between middle-class mothers' conceptions of the father's responsibilities toward sons and toward daughters is

most clearly shown is at the extreme where the mother believes that the father does not play much part in limit-setting, and yet the child does not turn to him as readily as to the mother. The mother is more likely to say she wishes her husband were more understanding, patient, and attentive to a *son* (50 per cent *vs.* 14 per cent for daughters), but more the disciplinarian for a daughter (33 per cent *vs.* 11 per cent for sons). Both the son and the daughter should be able to turn to their father, and, if this means that the mother has to accept responsibility for imposing constraints, she will do so without complaining (Table 5). But if the father does not act in such a way that his daughter can turn to him, he should at least assume more responsibility for limit-setting.

Middle-class fathers are far less likely to think that their daughters turn to them than that their sons do (Table 1). In large part, this is because they do not consider themselves as encouraging of daughters as of sons; but even where a father thinks he is encouraging of the daughter, he is more likely than not to say the girl turns to her mother. He is especially likely to think she turns to her mother under the very conditions where a boy would turn to his father—where the mother is the primary limit-setter (Table 4). Ten of the 13 middle-class fathers who say the mother plays the predominant part in setting limits for a son say the son turns to his father as readily as to his mother; under comparable conditions, only one of eleven fathers says the daughter turns to him. (But the fathers may be unduly reluctant to think their daughters turn to them; in three additional families, the mother says the daughter turns to her father, and in three others the daughter says she does.)

Yet, middle-class fathers are no more likely to wish to act differently toward daughters than toward sons (Table 6). This, of course, does not mean that they are complacent about their treatment of daughters: a fair proportion (28 per cent) would prefer to be more patient and understanding, while few (5 per cent) wish their wives to improve in this regard. Undoubtedly, they would prefer to be more encouraging of their children. But there is no indication that they think their daughters should turn to them more than they do. Nor is there any indication that they feel they should play a stronger disciplinary role toward their daughters; as with sons, they feel it their primary responsibility to be encouraging.

Mothers' and Fathers' Roles vis-à-vis Daughters in Working-Class Families

For a working-class mother to feel that her son turns to his father as readily as to herself, she must feel that the father plays a major part in limit-setting and is affectionate. In the case of a daughter, the conditions are quite different. The father's being affectionate is irrelevant to the mother's assessment of

whether or not the daughter turns to him. And, in direct contrast to the case for sons, working-class mothers are somewhat more likely to think the daughter turns to her father when he does *not* play a major part in limit-setting than when he does (Table 2, line 4b). In fact, the working-class mothers most likely to say that a daughter turns to her father are those who say that the father "gives in" to the girl more readily than she herself does (50 per cent *vs.* 19 per cent).

Few working-class mothers (or fathers, or daughters) think the daughter does turn to her father as readily as to her mother (Table 1). It does not seem, however, that working-class mothers deem it especially desirable for a daughter to do so (Table 5). Working-class mothers are apt to be critical of husbands whom they consider unencouraging of the daughter (albeit not as much so as when the father is not encouraging of a son); but beyond that, limit-setting takes precedence.

Unfortunately, we have interviewed too few working-class fathers and daughters to be able to learn much about their conceptions of the father's proper role, or why they are unlikely to say that the daughter turns to her father as readily as to her mother. We do know that working-class fathers are no more likely to want to act differently, or to have their wives act differently, toward daughters than toward sons (Table 6). It would seem that working-class fathers assume little responsibility toward their daughters, feeling, as with sons, that this is the mother's domain.

DISCUSSION

The Disparity between Mothers' and Fathers' Conceptions of Each Parent's Proper Role

Despite their disagreements as to the allocation of roles, we believe that within each social class mothers and fathers agree as to the relative importance of certain parental roles. To middle-class parents, it is of primary importance that a child be able to decide for himself how to act, and that he have the personal resources to act on these decisions. In this conception, the parents' responsibility for imposing constraints is secondary to their responsibility for being supportive; in the minds of some, for a parent to take a major part in imposing constraints interferes with his ability to be supportive. To working-class parents, on the other hand, it is of primary importance that the child act reputably, that he not transgress proper rules. In this conception, the parents' primary responsibility is to guide and direct the children. Here, constraint is accorded far greater value.

Mothers of both social classes believe that a father has special responsibilities toward a son: in the middle class, to be sufficiently supportive that the son is able to turn to him for advice and reassurance as readily as to his

mother; in the working class, to play a major part in setting limits and be sufficiently encouraging that the son is able to see the limits as guidelines for his own behavior, not just as arbitrary authority.

To the degree that middle-class mothers see the father's responsibilities toward a daughter as being different from those toward a son, it is that he should take greater responsibility for setting limits for the girl. But, as with sons, his primary responsibility is to be supportive. Working-class mothers would have their husbands play a more active part in setting limits for daughters, just as for sons. But, whereas this may be conducive to a son's turning to his father, for a daughter it means relying more heavily on her mother for advice and reassurance.

Middle-class fathers share their wives' views as to their own responsibilities toward sons, and act accordingly. They accept less responsibility for being supportive of daughters than their wives would have them assume—apparently feeling that this is more properly the mother's domain. Working-class fathers do not accept the obligations their wives would have them assume either toward sons or toward daughters. They appear to conceive of their own responsibilities more completely in terms of meeting the family's financial needs; raising the children is the mother's job.

One can readily understand why mothers would have their husbands take on greater responsibility for what they conceive to be the most crucial aspects of child rearing. One can also understand why the fathers act as they do. Given middle-class ideology, a father would feel greater obligation for being highly supportive of sons than of daughters: a son must be able to turn to and rely upon his father if he is to develop self-assurance as a boy and as a man-to-be; a daughter can rely more heavily on her mother. And given working-class ideology, what is to impel a father to assume the responsibilities for child rearing that his wife would have him assume? Of course, there will be occasions when he will have to backstop his wife, especially as the children grow older. But there is no ideological imperative that makes it *his* responsibility to play a larger part in child rearing.

The Allocation of Parental Responsibilities

Theories of personality development (3), up to and including Parsons and Bales's sociological re-interpretation of the classical Freudian developmental sequence (12), have generally been based on the model of a family in which the mother's and the father's intra-familial roles are necessarily differentiated, with the mother specializing in support and the father in constraint.[6] However

[6] Parsons and Bales talk of the father role as being relatively high on "instrumentality," low on "expressiveness," the mother role as complementary to it (p. 45). We interpret this to mean that the father specializes in imposing constraints, the mother in being supportive, both because this makes sense in the context of their general argument and

useful a first approximation this may be, both middle- and working-class variations on this general theme are sufficiently great to compel a more precise formulation.

Our data are at least partly consistent with the mother-supportive, father-constraining formulation, for even in middle-class families almost no one believes that the child turns to his father *more* readily than to his mother. Yet, in a sizeable proportion of middle-class families, it is the mother who takes primary responsibility for imposing constraints on sons, and the father is at least as supportive as the mother. And although middle-class fathers seldom seem to be as supportive of daughters as are their wives, it cannot be said that fathers typically specialize in constraint even with daughters.

It would be a gross exaggeration to say that middle-class fathers have abandoned the prerogatives and responsibilities of authority in favor of being friend and confidant to their sons. Yet, the historical drift is probably from primary emphasis on imposing constraints to primary emphasis on support. We have no way of knowing whether the more experienced and self-assured middle-class parents who see little if any conflict between limit-setting and support, or the less experienced and self-assured who see limit-setting as interfering with support, offer a better clue as to what we may expect to be the prevailing pattern of the future. We can say that in middle-class families the mother's and the father's roles are not sharply differentiated. To the degree that they are, a new division of responsibilities is developing, with each parent taking special responsibility for support of children of his own sex.

The mother's and the father's roles are more sharply differentiated in working-class families, with the children almost always feeling that the mother is the more supportive parent. Yet, despite the high valuation put on the constraining function, fathers do not necessarily specialize in setting limits for the children, even for the sons. In some working-class families the mother specializes in support, the father in constraint; in others—perhaps in most—the division of responsibilities is that the mother raises the children, the father provides the wherewithal. This pattern of role-allocation probably is and has been far more prevalent in American society than the formal theories of personality development have recognized.

It may well be that the trend once was from authoritarian to non-participant fathers, but is now from non-participant to supportive fathers.

Consequences for the Personality Development of Children

By age ten or eleven, the age at which the children in this study were interviewed, boys would be expected to identify with their fathers, girls with their

because of their statements to this effect (e.g., p. 80). It must be noted, however, that for Parsons and Bales the "instrumental" role refers not only to the father's role within the family, but also to his role in mediating between the family and the outside world.

mothers. From what we know of the different patterns of role allocation in middle- and working-class families, we should expect the problems of identification to be different for working- and middle-class children.

We know that few working-class boys feel that they can turn to and rely upon their fathers as readily as upon their mothers. Even those who do are in an anomalous situation, for their mothers do not think the father is setting a good example of how a father should act and may be quite dissatisfied with his behavior. Other working-class boys are in the equally unsatisfying situation of having a father who largely ignores them, or whose interest—so far as the boy can tell—is largely confined to the imposition of constraints. We take it as symptomatic of the working-class boy's difficulties in identifying with his father that almost no working-class parents told us that their sons "try to act like" father.

Middle-class boys are far more likely to feel that they can turn to their fathers, and are said to be more likely to "try to act like" their fathers. Presumably they find it easier to identify with their fathers. But we know little about the effects of a child's growing up in a family where the mother and the father may play almost indistinguishable roles, or where the mother plays more of the constraining role than the father does. Nor do we know much about the processes by which both middle- and working-class girls identify with their mothers. All we can say with certainty is that the processes are not adequately described by our formal theories of personality development, for they are based on a too simple model of family structure.

SUMMARY

This paper examines (a) middle- and working-class parents' conceptions of the relative importance of support and constraint in child rearing, and of how parental responsibilities for the two should be allocated between mother and father, and (b) parents' and children's assessments of how these responsibilities are, in fact, allocated. Since the father's role is potentially more variable, the analysis is focused on his role, *relative to* his wife's.

Middle-class mothers emphasize the father's obligation to be as supportive as the mother herself; his role in imposing constraints is of only secondary importance. Working-class mothers would have their husbands be more directive; the father's responsibility to play a major part in the imposition of constraints assumes far greater importance.

Middle-class fathers share their wives' conception of how responsibilities toward sons should be allocated, and seem to act accordingly. They do not appear to be as supportive of daughters; apparently they feel this to be more properly the mother's domain. Working-class fathers seem to play neither the

directive role their wives would have them play, nor a more highly supportive role. Rather, they seem to see child rearing as more completely their wives' responsibility.

Manuscript received: January 14, 1960
Revised Manuscript received: June 17, 1960
Melvin L. Kohn
National Institute of Mental Health
Bethesda 14, Maryland

REFERENCES

1. Anderson, J. E., *The Young Child in the Home: A Survey of Three Thousand American Families,* New York: Appleton-Century, 1936.
2. Bronfenbrenner, U., "Socialization and Social Class Through Time and Space," in E. E. Maccoby, et al., *Readings in Social Psychology,* New York: Holt, 1958.
3. Bronfenbrenner, U., "Freudian Theories of Identification and Their Derivatives," *Child Development,* 1960, 31, 15–40.
4. Davis, A., and R. J. Havighurst, "Social Class and Color Differences in Child-Rearing," *American Sociological Review,* 1946, 11, 698–710.
5. Ford, R. N., "A Rapid Scoring Procedure for Scaling Attitude Questions," in M. W. Riley, et al., *Sociological Studies in Scale Analysis,* New Brunswick, N. J.: Rutgers University Press, 1954.
6. Havighurst, R. J., and A. Davis, "A Comparison of the Chicago and Harvard Studies of Social Class Differences in Child-Rearing," *American Sociological Review,* 1955, 20, 438–442.
7. Kohn, M. L., "Social Class and Parental Values," *American Journal of Sociology,* 1959, LXIV, 337–351.
8. Kohn, M. L., "Social Class and the Exercise of Parental Authority," *American Sociological Review,* 1959, 24, 352–366.
9. Maccoby, E. E., and P. K. Gibbs, "Methods of Child-Rearing in Two Social Classes," in W. E. Martin and C. B. Stendler, *Readings in Child Development,* New York: Harcourt Brace, 1954.
10. Menzel, H., "A New Coefficient for Scalogram Analysis," *The Public Opinion Quarterly,* 1953, 17, 268–280.
11. Mitchell, H. E., "Social Class and Race as Factors Affecting the Role of the Family in Thematic Apperception Test Stories," *American Psychologist,* 1950, 5, 299–300 (abstract).
12. Parsons, T., and R. F. Bales, *Family, Socialization and Interaction Process,* Glencoe, Ill.: Free Press, 1955.
13. Spinley, B. M., *The Deprived and the Privileged: Personality Development in English Society,* London: Routledge and Kegan Paul, 1953.
14. Stouffer, S., et al., *Measurement and Prediction,* Princeton, N. J.: Princeton University Press, 1950.

Task-Oriented and Quasi-Therapeutic Role Functions of the Leader in Small Military Groups [1]

EDWIN B. HUTCHINS [2] AND FRED E. FIEDLER

University of Illinois

Our society expects men to perform many roles either successively or simultaneously. A policeman is a threat to some and a protector to others, and most men play the roles of husband, father, employer and employee all within the same day. Individuals differ in how readily they adapt to these varying role demands. It is also true, however, that certain roles, such as that of career woman and mother, are not easily reconciled and others are inherently incompatible.

The present study concerns two roles which the leader of a small task group is commonly asked to assume. His primary job is the maintenance of productivity. In addition, however, the armed services, as well as many industrial organizations, have urged men to take their personal problems to their immediate supervisors. The leader is thus asked to attend not only to his group's effectiveness but also to the psychological adjustment of his men. In fact, some writers have held that the leader must contribute to the group member's adjustment in order to be effective (10).

There are some indications that the practice of combining the leader's task-oriented and quasi-therapeutic roles may not be wise. Rogers (14), Traxler (18), and Roethlisberger and Dickson (13) have delineated some of the conflicts which arise when an administrator also serves as a therapist or counselor, and these problems have been discussed extensively by Slater (16). Work by Fiedler (6) and his associates indicates that effective task leadership depends on psychological distance from co-workers, while psychologically close relations are characteristic of good psychotherapists (4, 7). Opposite attitudes may thus be demanded by the roles of leader and "therapist," and these roles might then be difficult to combine.

This problem is of obvious importance not only as it contributes to our understanding of leadership and group behavior, but also as it affects the

[1] This investigation was conducted under Contracts DA–49–007–MD–569 and MD–2060 with the Office of the Surgeon General, Department of the Army (Fred E. Fiedler, Principal Investigator). We are indebted to Brigadier General Carter, then Commander of the 5th Regional Air Defense Command, and his staff, for permission to test the personnel who participated in the study and their collaboration in the research. We are indebted to Dr. Lee J. Cronbach for his suggestions regarding the treatment of the scores.

[2] Now Research Associate, Association of American Medical Colleges, Evanston, Illinois.

management of small groups in industry and in the armed services. Having a man consult his leader about his personal problems might not only retard the man's adjustment, but it may also force the leader into a role which arouses conflicts within him and which could, therefore, be detrimental to group effectiveness.

BACKGROUND OF THE PROBLEM

This study is an outgrowth of two recent research programs which related interpersonal perception measures (Assumed Similarity, AS) to group effectiveness and to informal relations which contribute to personal adjustment. These scores require a subject to describe himself by means of a short personality questionnaire, and then to describe others by using the same questionnaire. A comparison of any two ratings of others, or of a self rating and another rating, then indicates the degree of similarity which the subject assumes to exist between the ratees.

Earlier work with AS scores showed that reputedly good therapists assume a higher degree of similarity between themselves and their patients than do reputedly poorer therapists (7). Liked persons are also seen as more similar by the perceiver than are persons he does not like (8). These findings led to the interpretation that high AS indicates feelings of warmth and acceptance of another person.

A second group of studies, utilizing the score Assumed Similarity between Opposites (ASo), was concerned with the leader's influence on group effectiveness. ASo is obtained when we compare the subject's description of the most preferred and of the least preferred co-workers he has ever known. High ASo has been interpreted as indicating a feeling of acceptance toward co-workers, while low ASo presumably indicates psychological distance and reserve, especially to persons who are seen as poor co-workers. The findings have consistently shown that sociometrically accepted leaders with low ASo tended to have more effective groups than those with high ASo (6). These two lines of investigation suggested that the roles required of an effective leader and of a quasi-therapeutic person may be incompatible.

Four specific hypotheses were tested.

Hypothesis I. In groups in which the leader is sociometrically accepted, the leader's ASo will correlate negatively with group effectiveness, i.e., psychologically distant leaders will have better groups than will leaders who perceive similarity to their co-workers.

This hypothesis is essentially an extrapolation of earlier findings to a group setting in which psychological maintenance functions are relatively important. The qualification that ASo will correlate only in groups having sociometrically accepted leaders requires a word of explanation. As has been pointed out in a

previous paper (6), the attempt to predict group effectiveness by leader attitudes assumes that the leader's attitude will affect the men who perform criterion-relevant tasks. This is unlikely to occur unless the men are willing to be influenced by their leader. This willingness was here assessed by means of sociometric preference ratings. Since this hypothesis represents a replication of earlier work, it is one-tailed, testing whether the correlation is significantly greater than zero in the negative direction.

The second hypothesis asks whether ASo is related to group adjustment. The "great man theory" of leadership holds that a person with skills in dealing with one set of interpersonal problems will tend also to have competence in other areas of interpersonal relations. Hence:

Hypothesis II. The ASo score of the accepted group leader will correlate negatively with the average personality adjustment scores of his group members.

Previous research has shown that reputedly better therapists perceived their patients as more similar. From ratings made by the group leader we derived an analogous measure, the leader's Assumed Similarity to his group ($\overline{AS}g$). $\overline{AS}g$ indicates the average similarity which the leader perceives between himself and four other members of his group. On the basis of previous work we would, therefore, expect a positive correlation between $\overline{AS}g$ and the personality adjustment of the group. Hence:

Hypothesis III. The $\overline{AS}g$ score of the accepted group leader will be positively related to the group's adjustment.

Finally, we ask whether the person who perceives his actual fellow group members as similar to himself will also have a more effective group. Hence:

Hypothesis IV. The $\overline{AS}g$ score of the accepted group leader is positively correlated with group effectiveness.

PROCEDURE

The data for this study were collected in the context of a larger research program investigating quasi-therapeutic relations among members of small face-to-face groups (9).

Subjects

Participating in this study were 53 units of an Air Defense Command. Of these, 14 were radar-tracking units and 39 were gun crews. A total of 483 men were tested.

In contrast to most other military units stationed in the United States, these are operational, combat-ready troops. The men live and work together

at close quarters, and the stations are frequently located in fairly isolated areas. Each unit is commanded by a senior non-commissioned officer. The unit commander has power to grant or withhold passes, and he sets up work schedules and administers discipline for minor infractions.

The size of the units varied from six to 17 men. The subjects averaged 22.7 years of age and 11.2 years of schooling. Their average Army General Classification Test score was 101.2. Approximately 40 per cent of the men were married. Service in their assignment at the time of testing averaged 6.5 months. While the crews remain in existence over a relatively long time, a group can be composed of entirely different men within a year's time because of the continuous personnel turnover.

The Questionnaires

Measures of leader acceptance as well as of interpersonal perception and personal adjustment were obtained. Cooperation on the part of the men was satisfactory throughout. Only three individuals in 486 declined to cooperate in the study.

Sociometrics. The sociometric rating form contained six questions. Questions 1 and 2 were designed to measure acceptance of the leader on task-oriented functions. These asked the group members to list in order of preference the three men they would prefer (a) as leader if their unit were to come under unexpected attack, and (b) to have in their unit if they were to go into combat. Questions 3 and 4, designed to measure leader acceptance in a quasi-therapeutic role, asked the subject (a) whom in the group he would consult if he had personal problems, and (b) whom he considered best in helping a new man get used to the group and the work. Finally, whether the leader played the friendship role was determined by asking the subject (a) which man he liked best personally (Question 5) and (b) with which man he would prefer to go on a leave (Question 6).

First, second and third choices on these questions were weighted 3, 2, and 1. A group member was defined as "accepted" if he received the highest number of choices within his group on any specific question. We were thus able to dichotomize the formal leaders into those who did and those who did not receive the highest number of choices on a given question. The friendship cluster was discarded since only 10 per cent of the leaders were accepted on Question 5 and 5 per cent on Question 6.

The average percentage of leaders accepted on Questions 1 to 4 was 46, and allows us to discriminate accepted vs. nonaccepted leaders in a proportion consistent with previous findings on groups of this nature.

The *informal leader* (IL) role (Questions 1 and 2) involves task-oriented, managerial behaviors on the part of the role occupant which contribute to

maximizing group performance. The *therapeutic figure* (TF) role (Questions 3 and 4) involves behavior contributing to the psychological well being of group members. If the formal leader (FL) received more choices than any other group member on a given cluster, he was considered as accepted by the group in that role.

Of the 41 crew commanders on whom we had complete data, 18 were accepted both as informal leader and therapeutic figure (FL=IL=TF). An additional eight commanders were accepted as informal leaders but were not endorsed as therapeutic figures (FL=IL≠TF). The residual sample of 15 includes crew commanders not selected as the primary occupants for either role (FL≠IL≠TF). None of the unit commanders was accepted in the therapeutic role without also being accepted as informal leader.

In summary we concern ourselves with these five sociometrically determined samples:

FL=IL=TF	N=18
FL=IL≠TF	N= 8
FL=IL (Pooled Sample)	N=26
FL≠IL≠TF	N=15
FL (Total Sample)	N=41

Assumed Similarity Scores. A 20-item graphic rating scale was used to obtain descriptions of self and of others. The form of the scale followed Osgood's Semantic Differential. Examples of the items are given below:

Friendly	X : : : : : :	Unfriendly
Cooperative	X : : : : : :	Uncooperative
Stable	: X : : : : :	Unstable

The subject described himself by checking the space which most adequately represented his judgment of himself. He was then asked to describe his most and least preferred co-workers and the four men in his unit with whom he worked most closely, using identical scales.

Basically, Assumed Similarity (AS) scores compare by means of the D statistic (2, 12), two ratings obtained from a single individual. The greater the likeness of the profiles, the higher the degree of similarity the subject presumably sees in the two ratees.

Assumed Similarity between Opposites (ASo). In the above illustration of the scales, let the X represent the subject's description of his most preferred co-worker on each of the items. Thus, the subject marked the first three items toward the positive ends of the scales, giving values of 1, 1, and 2. Let us assume that he described his least preferred co-worker by marking the corresponding items at points 6, 5, and 5. D is obtained by taking the square

root of the sum of the squared item differences. In this case, the squared differences would be 25 on the first item, 16 on the second item, and 9 on the third item, yielding a sum of 50. D is the square root of this sum and here equals 7.07.

Note that the amount of similarity assumed by the subject is ***inversely*** related to the size of the D score. The more similar a leader sees his most and least preferred co-workers, the more his two descriptions of them coincide and the smaller his D score. Thus, a subject referred to here as a ***high*** ASo leader is one having a *small* D score.

Average Assumed Similarity to the Group ($\overline{ASg}$). An Assumed Similarity score can be computed between any pair of scale sheets completed by the subject. $\overline{ASg}$ was obtained by computing the D *between the self rating and each of the leader's four ratings of his actual co-workers.* The four obtained D's were then averaged. The resulting score, $\overline{ASg}$, was here considered to be conceptually analogous to the Assumed Similarity measure obtained in the client-therapist study (7). The measures ASo and $\overline{ASg}$ were unrelated in our sample (rho=.10, N=41).

Reliability of Assumed Similarity Scores. Previous studies on Assumed Similarity have consistently reported adequate reliabilities for these scores. The Spearman rank order reliability coefficient of ASo, based on an odd-even item split was .70. A reliability for $\overline{ASg}$ was obtained by comparing the $\overline{ASg}$ score based on ratings of the first and third co-workers with that based on the second and fourth co-workers. The rank order correlation of these two measures was .75. Since rank order methods were used in computing these reliability estimates, the Spearman-Brown prophecy formula is not an appropriate correction for length. These correlations, therefore, represent the lower bounds of an estimate and appear to be of adequate magnitude.

THE CRITERIA

Two types of criterion measures were required for this study: (a) measures of group effectiveness and (b) measures of the group members' personal adjustment.

Group Effectiveness

The primary mission of these groups is the defense against aerial attack of their geographical region. Although the crews vary in specific tasks, all are required to (a) acquire or locate targets with electronic equipment; (b) maintain their radar sets or guns, both of which are highly intricate pieces of equipment, and; (c) man the equipment with utmost dispatch when required.

Because adequate performance scores, which would be comparable for all groups, could not be developed, the main criterion of group effectiveness was based on subjective ratings. Officers in charge of radar areas or gun batteries were asked to make rankings of the crews under their command. These were concerned with target acquisition (radar) or effectiveness (guns) and equipment maintenance. To check the validity of the ratings, we compared, wherever possible, the reliable objective criteria with the subjective ratings. Where this could be done we found substantial agreement.

Reliability of Subjective Ratings. The agreement among raters for each type of rating obtained in each area or battery was assessed by Kendall's coefficient of concordance, *W* (15). The median W obtained from the twelve sets of target acquisition or effectiveness ratings was .78. The analogous set of maintenance ratings yielded a median W of .75. Each unit's average rank over raters was determined for each of the three criteria, and all scores were then transformed to make ratings in groups with different N's equivalent. These transformed scores, based on the averaged rank scores, comprised our scales of effectiveness and maintenance. These two measures correlated .80 and were, therefore, combined into a single measure of unit performance.

Group Adjustment

Group adjustment was defined in this study as the average personal adjustment score obtained by crew members. Scores from two self-rating inventories and a sick-call index were included in a composite index of adjustment.

The Taylor Scale of Manifest Anxiety. The Taylor Scale is composed of 50 items from the Minnesota Multiphasic Personality Inventory which contains self report items of overt signs of anxiety (17). Forty of these items were chosen for inclusion in the present study. The other ten items were dropped because they demand a verbal level beyond that reached by a substantial number of the subjects.

The General Army Adjustment Inventory. This scale is based on the assumption that an individual who is motivated to remain and succeed in a particular activity is better adjusted to the situation than a person wishing to withdraw. It measures such attitudes as one's willingness to go into combat, satisfaction with army training, feeling that one's job is worthwhile, etc. (11).

The rank order split half reliability coefficient for individual subjects was .82 for the Taylor Scale and .56 for the General Army Adjustment Inventory. Again these correlations represent minimum estimates.

While these scales appeared to have sufficient internal consistency, the reliabilities of the group adjustment means were considerably lower. The rank

order correlation between mean Taylor scores based on a random split of group members was .22 (uncorrected). The analogous estimate for the uncorrected reliability of the General Army Adjustment group mean was .18. These lower reliabilities suggest that the leader's influence on adjustment is relatively weak.

Dispensary Visits. On the basis of dispensary visits, the medical officer was asked to judge which of the visits could be considered psychophysiological in origin. Thus, a lower-back pain syndrome with no diagnosed organic basis was judged to fall into this category, as against continuing visits to have a broken arm dressed. A group measure was obtained by dividing a two-month total of dispensary visits judged psychophysiological in origin by the number

TABLE 1

Spearman Rank Order Intercorrelations among Group Means of Three Indices of Adjustment (rho's based on N=52 [1])

	General Army Adjustment Index	Dispensary Visits
Taylor Scale of Manifest Anxiety	.37*	.31*
General Army Adjustment Index		.02

[1] One gun crew was dropped from our sample because of insufficient data.
* Significant at the .05 level of confidence.

of men in the unit. The uncorrected rank order reliability coefficient for this measure, based on a random split of group members, was .60.

Interrelations Among the Criteria of Adjustment. Table 1 presents the rank order correlations among the group means of the three measures outlined above. The matrix of intercorrelations among individual scores was highly similar. The significant correlation between Taylor Anxiety and General Army Adjustment reflects in part the fact that they are both self ratings. The relation between Taylor scores and dispensary visits provides some evidence for the validity of the Taylor Scale. A composite measure of group adjustment was developed by ranking each group on each adjustment measure and then simply adding the ranks. Each measure was, therefore, equally weighted in the composite index which has an estimated reliability of .50.

Interrelations of Group Effectiveness and Adjustment. While we made no formal prediction concerning the relation between group effectiveness and adjustment, the hypotheses imply zero or negative correlations. Indeed low negative correlations were found in the sociometric samples of most concern to the study (Lines 1 and 3, Table 2). The fact that no significant relationship was obtained between group effectiveness and adjustment has important

implications for a "great man" theory of leadership. Leaders who fit the "great man" description presumably should be able to affect positively both group effectiveness and adjustment. If such leaders do in fact exist, they are likely to constitute a small minority. This finding, apparently, does not support the results of a laboratory study by Borgatta, Couch, and Bales (1).

RESULTS

Previous work led to hypotheses concerning relations between the accepted leader's Assumed Similarity scores and (a) group effectiveness, and (b) the average level of adjustment attained by group members. This study tested

TABLE 2

Spearman Rank Order Correlations between Group Effectiveness and Group Adjustment for Various Samples Based on Sociometric Questions

Sociometric Sample	N	rho
FL=IL=TF	18	−.25
FL=IL≠TF	8	−.04
FL=IL	26	−.17
FL≠IL≠TF	15	.26
FL	41	−.13

whether the factors which are important to effective leadership would also be important in aiding others to adjust. Two measures of the leader's Assumed Similarity, ASo and $\overline{\text{AS}}$g, were, therefore, correlated under various sociometric conditions with the measures of group effectiveness and adjustment.

Relation of Leader's ASo to Criteria of Group Behavior

The ASo score of the accepted leader (FL=IL) correlated negatively with group effectiveness (rho=−.36, Table 3). This result supports Hypothesis I and further extends the validity of previously reported findings. These results again show that the leader must have influence with his men (sociometric endorsement) in order to affect their behavior. The highest correlation (−.66) was found between group effectiveness and the ASo scores of accepted leaders who were not therapeutic figures. A comparison of the effectiveness scores of various sociometric sub-samples was made. This revealed no significant differences in performance of groups which accepted their commanders in a quasi-therapeutic role (FL=IL=TF) and those which accepted their leaders only in a task-oriented role (FL=IL≠TF) (p=.80).

On the other hand, the groups which accepted their commanders were more effective than those which rejected theirs (FL≠IL≠TF) (p=.01). These groups did not differ on the group adjustment criterion. As expected, correlations between ASo and effectiveness were not significant in the residual sample (FL≠IL≠TF) or in the total sample (FL).

No systematic relations were found between the leader's ASo and group adjustment regardless of the leader's acceptance by the group (Column 2, Table 3). Hypothesis II was, therefore, not supported.

TABLE 3

Spearman Rank Order Correlations[1] *between Leader's ASo and the Criteria of Group Effectiveness and Adjustment for Various Sociometric Samples*

Sociometric Sample	N	Group Effectiveness	Group Adjustment
FL=IL=TF	18	−.34	−.08
FL=IL≠TF	8	−.66*	−.19
FL=IL	26	−.36*	−.08
FL≠IL≠TF	15	−.07	−.02
FL	41	−.19	−.03

[1] High Assumed Similarity (small D score) received a rank of 1 as did good effectiveness and adjustment.

* Significant at the .05 level, one-tailed test.

Relation of Leader's $\overline{ASg}$ to Group Behavior

Hypothesis III posited a significant positive correlation between the $\overline{ASg}$ of accepted leaders and the adjustment of their groups. Table 4 shows that this predicition was not supported. Mean ASg and group adjustment were correlated significantly only where the formal leader was not accepted either as a therapeutic figure or as an informal leader (FL≠IL≠TF) (rho=.55). The significance of this finding is probably best understood through an analysis of the simple component scores which comprise the complex, dyadic score, $\overline{ASg}$. The main findings of such a component analysis are discussed below.

The final hypothesis predicted a positive relationship between the $\overline{ASg}$ of the accepted leader and the task performance of the group. Reference to Column 1 of Table 4 shows that positive correlations were obtained for these samples, although only the relationship in the total sample reached statistical significance.

To summarize the results:

(a) No relation was found between group effectiveness and group member adjustment.

(b) The score, Assumed Similarity between Opposites (ASo) of sociometrically accepted leaders correlated with the group effectiveness criterion in the expected direction (—.36).

(c) A significant positive correlation was obtained for the total sample between $\overline{AS}g$ and group effectiveness (.31).

(d) Contrary to Hypothesis II and IV, no systematic relationship was found between the accepted leader's ASo and $\overline{AS}g$ scores and the adjustment of his group.

TABLE 4

Spearman Rank Order Correlations[1] *between Leader's* $\overline{AS}g$ *and the Criteria of Group Effectiveness and Adjustment for Various Sociometric Samples*

Sociometric Sample	N	Group Effectiveness	Group Adjustment
FL=IL=TF	18	.45	.24
FL=IL≠TF	8	.08	—.21
FL=IL	26	.34	.00
FL≠IL≠TF	15	.36	.55*
FL	41	.31*	.13

[1] High Assumed Similarity (small D score) received a rank of 1 as did good effectiveness and adjustment.

* Significant at the .05 level, two-tailed test.

(e) For the leader who was *not* endorsed by the group, average Assumed Similarity to actual co-workers ($\overline{AS}g$) correlated positively with the group adjustment criterion (.55).

DISCUSSION

This study presented a further validation of a series of earlier investigations which related the accepted leader's ASo score to group performance criteria. The primary purpose of this investigation was, however, to test whether attitudes which are conducive to group effectiveness are detrimental to group adjustment. While this hypothesis was not confirmed, the opposite point of view, that the attitude which is conducive to group productivity will also aid group adjustment, likewise found no support. In fact, this paper showed that group effectiveness and group adjustment tend to be negatively correlated albeit insignificantly so, when the leader is accepted by his group. This finding

is thus not in accord with results of a laboratory study on the "great man" theory by Borgatta, Couch, and Bales (1). However, differences in design and selection of sample might well account for this discrepancy in findings.

A different picture is presented by Table 4 which showed relations of group effectiveness and adjustment with the measure Average Assumed Similarity to Group Members, $\overline{AS}g$. Here we find generally positive correlations which, according to previous research, would indicate that the leader's feeling of closeness to his immediate co-workers is related both to effectiveness and to adjustment criteria.

However, an analysis of the $\overline{AS}g$ score into its components indicated that one component of $\overline{AS}g$, the leader's average rating of others in his group, yielded significant and higher correlations with both criteria for the total sample than did the complex $\overline{AS}g$ score or any of the other components. In other words, the leader's average "esteem" of the four group members whom he rated correlated significantly with group effectiveness (rho$=+.38$, N$=41$) as well as with group adjustment (rho$=+.33$, N$=41$). The results of this analytic approach clearly support Cronbach's recent methodological suggestion in this area that complex interpersonal perception scores should be analyzed into their components to provide clearer interpretation of the data (3).

At least two interpretations of these results as substantive findings appear plausible. Since ASo correlates more highly with group effectiveness than any of the components we have investigated, the D statistic appears to be one possible method for assessing information in the most and least preferred co-worker profiles. We did find, though, that most of the variance in ASo can be attributed to the variance between most and least preferred co-workers. This component in turn is heavily weighted with the esteem score on the least preferred co-worker profile. While previous studies spoke of ASo as a generalized measure of distance from co-workers, it appears on the basis of these findings that effective leadership requires two divergent attitudes. Distance from group members who are considered to be poor co-workers is required, as well as esteem of or closeness to those co-workers who are both task-oriented and who see themselves as well adjusted. In other words, the effective leader perceived relatively great distance from his least preferred co-workers, but he saw his preferred co-workers as close and acceptable.

Alternatively, the data lend themselves equally well to the interpretation that the score $\overline{AS}g$ is a direct reflection of the group member's adjustment and effectiveness: the leader will rate men more highly if they perform well and if they appear well adjusted.

Our conclusions are, of course, limited by the fact that both criteria of

this study leave much to be desired. The group effectiveness criterion was based on officers' ratings. These were in turn based on fairly objective performance criteria and are, therefore, probably fairly accurate. The second criterion measure was a combined adjustment index. This measure was reliable for individual administration, but only about 25 per cent of the variance of this measure appeared to be related to group and/or leadership factors. Under these conditions we could not expect to obtain very high correlations between any predictors, such as leaders' Assumed Similarity scores, and group adjustment measures. The results of this study strongly suggest, however, that a replication would be highly desirable if more reliable group adjustment measures could be obtained.

SUMMARY AND CONCLUSIONS

A study was conducted to test whether the interpersonal attitudes of a leader of a small military group influenced the group members' adjustment as well as their effectiveness. Leader attitudes were measured by means of two independent Assumed Similarity scores, Assumed Similarity between Opposites (ASo) and Assumed Similarity to the group ($\overline{AS}g$). Members of 53 anti-aircraft artillery units participated in the study. The criteria of group effectiveness consisted of officers' ratings of units. Personal adjustment was measured by a composite index based on Taylor Manifest Anxiety scale items, the General Army Adjustment Scale, and the average number of dispensary visits per unit.

Previous studies using ASo have obtained significant relations between this variable and group effectiveness. This finding has again been confirmed in the present investigation for another group setting, one in which maintenance or sustaining functions are relatively important.

Contrary to theoretical expectations epitomized in the "great man" theory of leadership, no relation was obtained between group effectiveness and group adjustment. Similarly, leader attitudes reflected by ASo scores appear to be unrelated to group adjustment in this study.

An analytic treatment of the two interpersonal perception scores used suggested an alternative interpretation of ASo as a measure of psychological distance. The effective leader appears to be distant only from poor co-workers, rather than from all of his co-workers.

Manuscript received: April 10, 1959
Revised Manuscript received: May 4, 1960

Edwin B. Hutchins
Association of American Medical Colleges
2530 Ridge Avenue
Evanston, Illinois

REFERENCES

1. Borgatta, E. F., A. S. Couch, and R. F. Bales, "Some Findings Relevant to the Great Man Theory of Leadership," *American Sociological Review*, 1954, 19, 755–759.
2. Cronbach, L. J., and G. C. Gleser, "Assessing Similarity between Profiles," *Psychological Bulletin*, 1953, 50, 456–473.
3. Cronbach, L. J., "Proposals Leading to Analytic Treatment of Social Perception Scores," in R. Tagiuri and L. Petrullo, *Person Perception and Interpersonal Behavior*, Stanford, California: Stanford University Press, 1958.
4. Fiedler, F. E., "An Investigation Into the Concept of the Ideal Therapeutic Relationship," *Journal of Consulting Psychology*, 1950, 14, 239–249.
5. Fiedler, F. E., "The Psychological Distance Dimension in Interpersonal Relations," *Journal of Personality*, 1953, 22, 142–150.
6. Fiedler, F. E., *Leader Attitudes and Group Effectiveness*, Urbana, Illinois: University of Illinois Press, 1958.
7. Fiedler, F. E., and Kate Senior, "An Exploratory Study of Unconscious Feeling Reactions in Fifteen Patient-Therapist Pairs," *Journal of Abnormal and Social Psychology*, 1952, 47, 446–453.
8. Fiedler, F. E., F. J. Blaisdell, and W. G. Warrington, "Unconscious Attitudes as Correlates of Sociometric Choice in a Social Group," *Journal of Abnormal and Social Psychology*, 1952, 47, 790–796.
9. Fiedler, F. E., E. B. Hutchins, and J. S. Dodge, "Quasi-Therapeutic Relations in Small College and Military Groups," *Psychological Monographs*, 1959, 73, No. 3 (Whole No. 473).
10. Gordon, T., *Group Centered Leadership*, Boston, Massachusetts: Houghton Mifflin, 1955.
11. Havron, M. D., R. J. Fay, and D. M. Goodacre, III, "Research on the Effectiveness of Small Military Units," PRS Report No. 885, Institute for Research on Human Relations, 1951.
12. Osgood, C. E., and G. Suci, "A Measure of Relation Determined by Both Mean Difference and Profile Information," *Psychological Bulletin*, 1952, 49, 251–262.
13. Roethlisberger, F. J., and W. J. Dickson, *Management and the Worker*, Cambridge, Massachusetts: Harvard University Press, 1938.
14. Rogers, C. R., *Client-Centered Therapy*, Boston, Massachusetts: Houghton Mifflin, 1951.
15. Siegel, S., *Nonparametric Statistics for the Behavioral Sciences*, New York: McGraw-Hill, 1956.
16. Slater, P. E., "Role Differentiation in Small Groups," *American Sociological Review*, 1955, 20, 300–310.
17. Taylor, Janet A., "A Personality Scale of Manifest Anxiety," *Journal of Abnormal and Social Psychology*, 1953, 48, 285–290.
18. Traxler, A. E., *Techniques of Guidance*, New York: Harper and Brothers, 1945.

The Measurement of Disproportionality [1]

VERNON DAVIES, *Washington State University*

Social scientists are often concerned with questions of proportionality and its converse, disproportionality. Do social classes contribute proportionately to political party membership? Do occupational groups contribute proportionately to the number of gifted children that appear? Are nonvoters found in the country in the same proportion as in the city? Where data show that such questions must be answered in the negative, disproportionality obtains and a clue is present, affording an improved understanding of human behavior.

A RATIONALE FOR MEASURING DISPROPORTIONALITY

Disproportionality, considered as a measure of association, derives its meaning from the concept of differential quotas. If, for example, three social classes in a community, lower, middle and upper, taken as the independent variable,[2] contribute, in relation to size, the same quota of members to three political parties, Republican, Democratic and Socialist, taken as the dependent variable, then disproportionality is zero in amount. If the quotas differ by social class for any of the three political parties, the amount of disproportionality obviously exceeds zero. Since we are asking whether the categories of one grouping contribute differentially to the respective categories of another grouping, *and not the reverse,* disproportionality is asymmetric or directional. Inasmuch as disproportionality implies direction it will be convenient to use a type of cross classification in which the categories of the independent variable are tabulated by columns and the categories of the dependent variable by rows, with the frequencies for each column converted to proportions of the column's total frequency. Thus, the sum of the proportions for each column will equal unity, as shown in Table 1. With this kind of table in mind, attention will first be given to maximum disproportionality, corresponding to perfect correlation. Where this obtains, all the nonzero proportions for the paired observations are located in a subset of m cells, where m is equal to

[1] Grateful acknowledgment is extended Frederick Mosteller for helpful criticisms used in developing this paper.

[2] The word "independent" is used here in the conventional correlational sense to mean that one variable is taken as prior, either as a causal factor or as a basis for estimating or otherwise evaluating a "dependent" variable. The term *variable* is used in the sence employed by Guttman, as referring to a set of values that may be either quantitative (numerical) or qualitative (nonnumerical). See (5).

the number of columns (c) containing nonzero proportions, or the number of rows (r) containing nonzero proportions, whichever is larger. That is,

$$m=\max(c, r),$$

with the understanding that if c=r, then m=c=r. (For the sake of simplicity, in the remainder of the discussion, only those tables will be considered in which each column and each row has one or more nonzero proportions in it. It should be remembered, however, that the formulas to be presented later are fully consonant with the definitions of c and r just presented.)

For a given c x r table, the manner in which the cells in the m subset are distributed may differ, assuming maximum disproportionality. Where c=r=2,

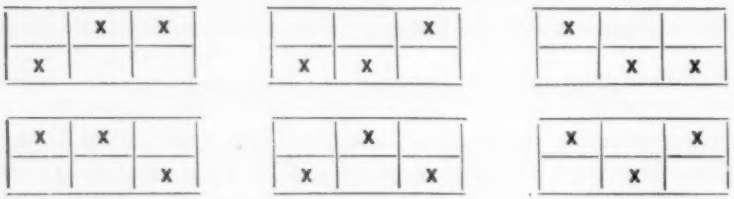

FIGURE 1

Examples of Complete Disproportionality for a 2 x 3 Table

The x's indicate location of nonzero proportions. For any table yielding complete disproportionality, the number of possible cell patterns containing nonzero proportions=m!, where m=max(c, r).

the nonzero proportions will be located in one or the other of the two diagonals. Where c or r or both exceed 2, the number of possible subsets of m cells mounts rapidly as size of table increases. By way of a simple illustration, the number of possible subsets of m cells to be found in a 2 x 3 table is shown in Figure 1. It may be noted that *a minimum of one cell from the m subset is found in each column and each row*. This fact is general in application to all tables where maximum disproportionality occurs.

In the case of zero disproportionality, the quotas contributed by the categories of the independent variable to the respective categories of the dependent variable are identical. Thus, if the independent variable is tabulated by columns and the dependent variable by rows, the quotas (proportions) within any given row will be equal where disproportionality is absent. This situation conforms to a condition in which chi square is equal to zero when computed for the data, implying statistical independence.

The degree of proportionality will, in general, increase to the extent that the proportions are concentrated in a limited portion of the cells. With maxi-

mum disproportionality, the concentration will be found in a subset of m cells, conforming to the definition of m mentioned above. In practice, attention must often be given to the concentration of relatively high proportions, not only in the m subset of cells, but in any of the remaining cells. This fact will become evident when parts A and B of Table 1 are compared. For both parts of the table, m=3, with the largest proportions found in the diagnoal set of m cells extending from upper left to lower right. In Part A, the proportions in the six remaining cells are identical. In Part B, on the other hand, there is a marked concentration of relatively high proportions in three of the

TABLE 1

Example of Effect of Differing Patterns of High Proportions on Size of d

Example A			Row Mean ($\bar{p}$)	Example B			Row Mean ($\bar{p}$)
.50*	.25	.25	.33	.50*	.49	.01	.33
.25	.50*	.25	.33	.01	.50*	.49	.33
.25	.25	.50*	.33	.49	.01	.50*	.33
1.00	1.00	1.00	.99	1.00	1.00	1.00	.99
$d=\frac{(.50+.50+.50)-(.33+.33+.33)}{3-1}=.25$				$d=\frac{(.50+.50+.50+.49+.49+.49)-(.33+.33+.33+.33+.33+.33)}{3-1}=.49$			

* Subset of m cells in which the sum of the positive deviations is a maximum.

six residual cells. This latter fact needs to be reflected in the magnitude of any measure of disproportionality. A simple way of doing this is to begin by summing all the positive deviations of observed from expected proportions. The ratio of this sum to the maximum sum of positive deviations, assuming complete disproportionality, can then be used as a coefficient. The properties of this measure will be discussed later.

THE COEFFICIENT OF DISPROPORTIONALITY (d)

In developing a coefficient based on the rationale described above, one may begin by preparing a double polytomy and converting the frequencies to proportions in the manner described earlier. With this accomplished, two values must be determined for use in computing the coefficient:

a. A subset of m cells must be selected, containing a minimum of one cell from each column and row such that the sum of the positive deviations in the subset is a maximum. The sum of the expected proportions in this subset should then be obtained, denoted by Σp_{em}. The expected proportion for any cell is simply the mean of the observed proportions in the row containing the cell.

b. The sum of all the positive deviations of observed from expected proportions for the entire table must next be obtained. If we denote by p_{o+} an observed proportion in a cell containing a positive deviation and the accompanying expected proportion, assuming statistical independence, by p_{e+}, then the desired sum is equal to

$$\Sigma(p_{o+}-p_{e+}).$$

With the two sums determined, and noting c, the number of columns in the table, we can compute d as follows:

$$d=\frac{\Sigma(p_{o+}-p_{e+})}{c-p_{em}}. \qquad [1]$$

TABLE 2

Achievement Motivation Score by Social Class [1]

Achievement Motivation Score	Social Class				Row Mean (p)
	I & II	III	IV	V	
Low	.17	.57*	.70*	.77*	.55
High	.83*	.43	.30	.23	.45
Total	1.00	1.00	1.00	1.00	

$$d=\frac{(.83+.57+.70+.77)-(.45+.55+.55+.55)}{4-(.45+.55+.55+.55)}=.41$$

[1] Source: B. C. Rosen, The Achievement Syndrome: A Psycho-Cultural Dimension of Social Stratification, *American Sociological Review*, 1956, 21, 206.

* Subset of m cells in which the sum of the positive deviations is a maximum.

For computational purposes, it is convenient to use the following modification of formula [1]:

$$d=\frac{\Sigma p_{o+}-\Sigma p_{e+}}{c-p_{em}}. \qquad [2]$$

An example of the use of formula [2] is shown in Table 2.

Where c=r, we may simplify the preceding formula to:

$$d=\frac{\Sigma p_{o+}-\Sigma p_{e+}}{c-1}. \qquad [3]$$

This is possible, due to the fact that for all c=r tables, the value of Σp_{em} is equal to unity. For 2 x 2 tables, d is particularly easy to compute. It is only necessary to find the absolute difference between the two proportions in either of the two rows, as indicated in Table 3.

COMPARISONS OF MEASURES

None of the coefficients currently applied to variables with nominal or ordinal categories has been devised specifically for use with differential quotas, with the accompanying implication of directionality. This being the case,

these coefficients are not to be criticized if they fail to measure disproportionality adequately, since they were never intended to serve this purpose. Conversely, the new coefficient, introduced here, is not designed for use in situations where neither variable is taken as prior and where differential quotas are not the center of interest. Nevertheless, there would still appear to be a need for comparing the new measure with older ones already in use.

Because of space limitations, no attention will be given to measures of correlation restricted to use with 2 x 2 tables.[3] Measures adapted to tables

TABLE 3

Family Setting of Patients Rehospitalized and Those with Low Level of Performance Who Remain in the Community [1]

	Family Setting		Row Mean ($\bar{p}$)
	Parental	Conjugal	
Remain in community at low level of performance	.65*	.26	.45
Rehospitalized	.35	.74*	.55
Total	1.00	1.00	

$$d=\frac{(.65+.74)-(.45+.55)}{2-1}=.39$$

$$d=.65-.26=.39 \text{ (Shortcut solution)}$$

[1] Source: H. E. Freeman and O. G. Simmons, Mental Patients in the Community: Family Settings and Performance Levels, *American Sociological Review*, 1958, 23, 152.

* Subset of m cells in which the sum of the positive deviations is a maximum.

of all sizes include Pearson's contingency coefficient (C):

$$\sqrt{\chi^2/(\chi^2+n)};$$

Tschuprow's T:

$$T^2=\frac{\chi^2/n}{\sqrt{(c-1)(r-1)}},$$

where c=the number of columns in a contingency table and r=the number of rows; and unnamed variation of C devised by Cramér, computed as follows:

$$\sqrt{(\chi^2/n)/\min(c-1, r-1)};$$

a coefficient of relative predictive efficiency devised by Guttman (g):

$$g=\frac{(n-n'_a)-\Sigma(n_{jb}-n'_{ajb})}{n-n'_a},$$

where n=size of sample, n'_a=frequency in modal category of a, the predicted variable, n_{jb}=frequency in jth category of b, the predictor variable, n'_{ajb}= frequency in modal category of a for jth category of b; and a coefficient

[3] Quite a number of coefficients have been invented that are limited to use with 2 x 2 tables. Since this is a rather serious limitation, these measures are not considered here. For an extended discussion of them see (3).

specially devised for use with ordered categories in both variables by Goodman and Kruskal (h):

$$h=\frac{S-D}{S+D},$$

where S=sum of products obtained by multiplying each cell frequency by the sum of all the frequencies below and to the right of it, and D=the sum of products obtained by multiplying each cell frequency by the sum of all the frequencies below and to the left of it.

Descriptions and/or criticisms of these measures may be found in the literature (1, 2, 4, 6, 7). Our purpose here is to discuss the adequacy of these coefficients as measures of disproportionality.

In comparing the properties of d with the coefficients in current use, reference will be made to the type of cross-classification described earlier, in which the independent variable is tabulated by columns, and the dependent variable by rows, with the column frequencies expressed as proportions of their respective column totals. With this kind of table in mind, the following comparisons are made:

1. *The d coefficient takes one variable as being prior.* Guttman's g is the only other of the coefficients mentioned above having this property. Both d and g are directional and both may differ, depending on which variable is taken as prior. This is a necessary property of d, since the quotas may differ, depending on which variable is taken as the independent one. For Community B in Table 4, if social class is taken as prior, d=.550 and g=.214. If political party is taken as prior, d=.340 and g=.000. The other four coefficients, C, T, h and Cramér's, are all nondirectional. For any given cross-classification of data, each of them has one and only one value.
2. *The d coefficient is always zero where the variation of within-row proportions is zero—corresponding to statistical independence.* This necessary characteristic of the absence of disproportionality is also a property of C, T, h and Cramér's measure, but not of g. The latter may be zero when a chi square value for a table reaches a high level of statistical significance.
3. *The d coefficient is always unity when all the nonzero proportions are located in a subset of m cells, where m=max(c, r), corresponding to perfect correlation.* Only g, h and Cramér's measure share this property. The T coefficient can reach unity only when c=r, while C approaches but never reaches unity as min(c, r) increases.
4. *The d coefficient always remains constant when the quotas remain constant.* None of the other measures mentioned possess this property, as is indicated in the comparison shown in Table 4. In this table, hypothetical data for two communities are shown in which membership in social class (lower, middle and upper) is cross tabulated against membership in political party (Republican, Democratic and Socialist). In Community A the social classes are equal in size; in Community B the upper class is much smaller in size than the other two. It may be noted further, and this is critical for the present discussion, that the proportions in the respective political parties belonging to the respective social classes are *identical* for both communities. Since the quotas, expressed as proportions, are identical for both com-

TABLE 4

Correlation of Social Class and Political Party Membership in Two Communities
(Hypothetical Data)

Political Party Membership		Community A				Community B			
		Social Class			Row Mean ($\bar{p}$)	Social Class			Row Mean ($\bar{p}$)
		Lower	Middle	Upper		Lower	Middle	Upper	
Republican	f	400	800	3,600		1,000	1,000	900	
	p_o	.10	.20	.90*	.40	.10	.20	.90*	.40
Democratic	f	1,600	2,800	400		4,000	3,500	100	
	p_o	.40	.70*	.10	.40	.40	.70*	.10	.40
Socialist	f	2,000	400	0		5,000	500	0	
	p_o	.50*	.10	.00	.20	.50*	.10	.00	.20
Total	f	4,000	4,000	4,000		10,000	5,000	1,000	
	p_o	1.00	1.00	1.00		1.00	1.00	1.00	

Coefficients **	(A)	(B)	(A—B)
d	.550	.550	.000
C	.642	.525	.117
Cramér	.592	.437	.155
T	.592	.437	.155
g	.500	.214	.286
h	.868	.728	.140

$$d=\frac{(.50+.70+.90)-(.20+.40+.40)}{3-1}=.550$$

* Subset of m cells in which the sum of the positive deviations is a maximum.
** See text for identification of coefficients.

munities, any coefficient purporting to measure disproportionality of membership in political parties in relation to social class should be the same for both communities. Only d accurately reflects this identity, since it is unaffected by the shift in the degree of skewness for the independent variable from Community A to Community B. All the other coefficients show differences, ranging in size from .115 to .286.

As may be noted, d is the only one of the coefficients fully conforming to the criteria mentioned. Although not unique in this respect, it is also very easy to compute.

SUMMARY

The concept of disproportionality is derived from differential quotas contributed by the categories of an independent variable to the categories of a dependent variable. Desirable properties of a coefficient to measure degree of disproportionality include: directionality, a value of zero with statistical

independence, a value of unity with perfect correlation, freedom from change when the differential quotas remain constant, applicability to contingency tables of all sizes, and ease of computation. The d coefficient, introduced here, is unique in possessing all these properties. It is defined as the ratio of the sum of all positive deviations of observed from expected proportions, assuming statistical independence, to the maximum possible sum of such deviations for a given table.

Manuscript received: December 29, 1959
Revised Manuscript received: April 7, 1960

Vernon Davies
Department of Sociology and Anthropology
Washington State University
Pullman, Washington

REFERENCES

1. Cramér, H., *Mathematical Methods of Statistics,* Princeton: Princeton University Press, 1946, 282, 283.
2. Goodman, L. A., and W. H. Kruskal, "Measures of Association for Cross Classifications," *Journal of the American Statistical Association,* 1954, 49, 732–764.
3. Goodman, L. A., and W. H. Kruskal, "Measures of Association for Cross Classifications II: Further Discussion and References," *Journal of the American Statistical Association,* 1959, 54, 123–163.
4. Horst, P., et al., *The Prediction of Personal Adjustment,* New York: Social Science Research Council Bulletin 48, 1941, 258–260.
5. Stouffer, S. A., et al., *Studies in Social Psychology in World War II,* Vol. 4, Princeton: Princeton University Press, 1950, Ch. 3.
6. Wallis, W. A., and H. V. Roberts, *Statistics, A New Approach,* Glencoe, Illinois: The Fress Press, 1956, 282–284.
7. Yule, G. U., and M. G. Kendall, *An Introduction to the Theory of Statistics,* London: Charles Griffin and Co., Ltd., 13th Ed., 1950, Ch. 3.

Intergroup Interaction as Related to Status and Leadership Differences between Groups [1]

HENRY L. MANHEIM, *Arizona State University*

The experiment herein reported upon is one part of a larger project designed to study several aspects of intergroup interaction. This portion was a laboratory test of the hypothesis: *the greater the differentiation between groups, the greater the likelihood of intergroup conflict.* In other words, according to this hypothesis, if some measure is available by which differences between groups can be ranked (i.e., groups A and B are "more different" from each other than are groups C and D) this measure will be related to the amount of conflict between the groups. This hypothesis was originally suggested several years ago by Williams (19, pp. 51–58). Intergroup conflict was selected as the particular mode of interaction to be investigated because of its practical importance, and because conflict lends itself especially well to experimental manipulation.

While it is hardly necessary to justify a small-group study today, there are three areas of importance of such a study which should be specified briefly. First, interaction is the basic concept for sociology, and one which therefore merits much study. Second, a study of *inter*group interaction, as differentiated from *intra*group interaction, is necessary in order to place studies of individual groups in their proper perspective, as well as being of importance in its potential contribution to practical affairs. Third, the study of small groups has merit not only because of the great number and impact of such groups in society, but, even more importantly, because such studies are a methodological device—a technique. They are the sociologist's test-tube, whereby he can control the variables he is studying, in order to gain knowledge about large social systems.

Space limitations prevent a detailed exposition of the theoretical frame of reference within which this study was conducted. The writings of Simmel, von Wiese, and Cooley on interaction and groups were, of course, very influential. More recent works which shaped this project were: (a) the writings

[1] Revision of a paper read at the annual meeting of the American Sociological Society, at Seattle, August, 1958. The author is indebted to Robert F. Bales, of Harvard University, for making available case histories and for assistance in scoring interaction records; to Paul A. F. Walter, Jr., of the University of New Mexico, for assistance in obtaining experimental subjects and space; to David G. Hays, of the Rand Corporation, for aid at many stages of the project; and to Harvey J. Locke, of the University of Southern California, for guidance throughout the entire research.

on action theory, especially by Bales and by Parsons and his associates, and (b) small group theory, particularly Homans's theory, and the work focused on social norms, notably by Newcomb and Sherif.

The literature abounds with references to intergroup interaction, intergroup relations, and similar titles. Yet a careful search has revealed only a relatively few references which are at all pertinent to the present study. This apparent paradox is explained very simply, however, when it is recognized that the term "group" has at least two separate and distinct meanings. On the one hand, it is used to refer to large aggregates of people who may have only ethnic background, or occupation, for example, in common. That is, the term is clearly being used to refer to a category or descriptive class of people, such as Negroes, or white-collar workers. ("Category" is a more acceptable term for these aggregates.) On the other hand, "group" is used as virtually synonymous with "small group," that is, referring to two or more individuals who are actually in interaction at the time. For the purposes of this research the latter definition of "group" was utilized. Obviously, according to this definition, groups may be ephemeral and fleeting, as well as more stable and enduring. However, the great bulk of the literature which is subsumed under intergroup interaction (and similar headings) utilizes "group" in the former sense; most of the literature on intergroup interaction deals with the relationships between *categories* of people, not between *groups*. A study of the attitudes of Negroes and Caucasians toward each other, for example, is *not* a study of intergroup relations.

Thus, while regrettable, it is not surprising that, as far as can be determined, the entire body of experimental investigations of interaction between groups is limited to six studies. In a study of group cohesiveness, Thibaut observed intergroup communication as part of his procedure (16). As part of another study, Kelley studied the communication of criticism as related to status differences between two groups (6). Kohn and Williams conducted a field experiment consisting of observations of contrived situations of interaction between Negroes and Caucasians (7). While this does not strictly conform to the definition of group used in the present study, Kohn and Williams's study is notable because it is one of the extremely few attempts experimentally to investigate interaction between different ethnic categories. The most impressive experimental work in the relations between groups has been conducted by Sherif and his associates. The well-known summer-camp experiments, in which the interactions between groups of adolescent boys were carefully controlled and observed, yielded much valuable information about roles, norms, and the reduction of intergroup friction (10, 11, 12, 13, 14). Portions of the experimental techniques utilized in the summer-camp studies were, in turn, drawn from Avigdor's investigations of friendship groups in

New York and Harvey's study of cliques in a university women's dormitory (1, 5).

Thus, while the great interest in, and importance of, the general topic of intergroup interaction are well known, still, the above six studies comprise essentially the total body of pertinent literature. The present research was undertaken because of this great need for, and lack of, investigation of interaction between groups of people, and to demonstrate that such studies can be done in the laboratory. While the experimental results, to be presented below, are important, the methodological aspects of this study are seen to be of equal value. Laboratory studies of intergroup interaction are possible, feasible, and profitable.

EXPERIMENTAL DESIGN

In order to test the hypothesis, the following design was used. Sixteen triads were formed from paid student subjects. They were male Caucasians, with a university standing of junior, senior, or graduate level; each had a scholastic grade average of C or better, and the age range was 19 to 37. The project was described to the subjects as an attempt to determine some of the relationships between certain personal characteristics and certain types of leadership situations, on the one hand, and the ability of a group to solve problems of human relations, on the other hand. Each subject initially completed two tests: an Otis I.Q. and the *Thurstone Temperament Schedule* (9, 17).

The subjects were formed into triads in what was, for all practical purposes, a random manner, based purely upon convenience in scheduling meetings. Each subject remained a member of the same group throughout the course of the experiment. Every effort was made so that each subject was unaware of the identity of any of the other subjects outside his own group. The assumption was that the groups were essentially similar, based upon the above matching and randomization. While it might have been preferable to match the subjects more closely, it will be seen that this was not a limiting factor, if the distinction between groups and individuals is kept in mind. As will be shown below, the important thing for this research was that the *groups* which were interacting with one another be as similar as possible (except for the deliberately introduced experimental variables). The sum total of the personality and other characteristics of the individual members of a group is only *one* of the many factors which determine the nature of that group. As Warriner points out, groups are explicable without reference to individual psychology (18).

Next, the experimental design called for the introduction of two dimensions or variables by the experimenter. The purpose of these dimensions was to

provide a means whereby the extent of differences between the groups could be ranked. The dimensions chosen were as general as possible, namely, leadership and relative status, since these are characteristic of most human groups, rather than being applicable only to the groups in this experiment. On a random basis, each triad was assigned either a high or low status, and each had either an appointed leader or no leader. (Henceforth, the no-leader situation will be referred to as the "emergent leader," since this is more in keeping with what is known about leadership [4].) Thus there were four possible combination of these dimensions: high status with appointed leader, high status with emergent leader, low status with appointed leader, and low status with emergent leader.

How were these status and leadership characteristics imparted to the groups? This was done in the following manner. Each group met with the experimenter at two "in-group" sessions, of one hour each. After the three group members were introduced to one another, the group was told that it had been formed solely on the basis of the two tests which each subject had taken previously. They were told that, on the basis of the Otis test, they had been formed into a group whose average I.Q. was higher (or lower) than the other groups in the experiment. This, of course, was the status dimension. Certainly, in a university community, I.Q. is an important determinant of status. If members of a group perceive another group as having a higher or lower average I.Q. than their own, this will be perceived as a status difference. The group members were told also that, on the basis of the *Temperament Schedule,* they had been formed into a group which would work best with an appointed leader (or with no leader). The experimenter appointed a leader in the former case. (In such groups the subjects were told that the leader's role was to ensure that the group reached a decision, not to make a decision himself.) As will be discussed below, no systematic data were collected as to the effectiveness of leadership or the appearance of a leader in the emergent leader groups. However, subjective evidence indicated that, in most of the emergent-leader groups, someone did assume the role of leading and organizing the discussions.

As for the Otis and Thurstone tests, in actuality the test results played no part in the experiment, other than to serve as the pretext for determination of the groups' dimensions. At the conclusion of the experiment each subject was advised of the true facts of the design, and was given a summary of his actual test results.

In these in-group sessions, the status and leadership dimensions of their group were not merely reported to the subjects. On the contrary, every effort was made to further the credibility of these ideas. The attempt was made to aim the material at the emotions rather than the intellects of the subjects.

The status differences were emphasized in regard to the group's purported average I.Q. For example, the high I.Q. groups were told, "You gentlemen are to be congratulated; the results of the Otis test have been used to form this very high I.Q. group. That is, the average I.Q. of the three of you is very high—much higher than most of the other groups involved in the experiment. I am sure that this will have some very significant effects upon the manner in which you handle the case histories which you will be discussing. . . ." Similarly, the low I.Q. groups were told in part, "Well, gentlemen, I'm sorry to say that this group is one of these so-called low I.Q. groups which I've just told you about. The average I.Q. of this group is considerably lower than most all of the others which are involved in this experiment. Now, remember what I said, it's nothing to feel ashamed about, or anything like that, and nobody else will know about this anyhow. . . ." In like fashion, the implications of authoritarian or democratic structures were stressed in connection with the two leadership situations.

Furthermore, the entire emphasis in this part of the procedure was on their working as a group, as a team, and the importance of the individual subject, as compared to the group, was de-emphasized. ("Your team is vital to the success of the whole experiment. . . .")

A written protocol, or "script," was used by the experimenter to guide the presentation of this material to the subjects, so that each of the four types of groups was told almost exactly the same thing and in the same manner.

The whole purpose of this portion of the experiment was to impart the assigned dimensions to the groups and to reinforce them, and to encourage group identification on the part of the individual subjects. All of the experimenter's behavior was oriented to this end, and was planned so as to be credible to a group of relatively sophisticated college students.

At this stage of the experiment, the presumption was that the 16 groups were similar to one another with the exception of the two dimensions, status and leadership, which had been introduced. Data were not collected to substantiate this presumption of the acceptance of these perceived differences. However, there were enough questions and incidents which came to the experimenter's subjective attention to confirm the presumption. Furthermore, content of the notes, written later in the course of the experiment, also supported this presumption.

Following this orientation, at both the in-group sessions, the group was given a task of discussing a case history of a human relations problem and writing up a brief recommendation for its solution. The purpose of this was to provide practice in a situation similar to the actual experimental sessions which would follow the in-group sessions.

These in-group sessions were followed by the actual experimental sessions,

all the procedures described above having been preliminaries. Each group participated in four one-hour experimental sessions, interacting with one of each of the four types of groups (high status with appointed leader, high status with emergent leader, low status with appointed leader, and low status with emergent leader). With the 16 triads, there was thus a total of 32 experimental interaction situations. The breakdown of these, with the number of interaction situations for each combination of group-characteristic types

TABLE 1

Number and Characteristics of the Various Kinds of Interaction Situations

Types of Groups in the Interaction Situation	Number of Dimensions in Which the Groups Differed	Dimensions in Which the Groups Differed	Total Number of Situations
HA–HA*	0	none	2
HE–HE	0	none	2
LA–LA	0	none	2
LE–LE	0	none	2
HA–HE	1	leadership	4
HA–LA	1	status	4
HE–LE	1	status	4
LA–LE	1	leadership	4
HA–LE	2	status and leadership	4
HE–LA	2	status and leadership	4
		Total	32

* HA: high status-appointed leader LA: low status-appointed leader
HE: high status-emergent leader LE: low status-emergent leader

and the number and dimension of differences between the interacting groups, is shown in Table 1. It will be noted that, of the 32 interaction situations, there was a total of eight in which there were "zero" differences, 16 in which there was one difference, and eight in which there were two differences, between the interacting groups. The scheduling of these sessions made use of a Latin Square design, in order to compensate for any variations which might be introduced by learning, by location of meeting, and by the nature of the differences between the groups.

In order clearly to distinguish between *inter-* and *intra*group interaction, the two groups in each situation met in separate rooms and interacted with each other by means of written notes. These notes thus comprised a complete record of the interaction between the two groups. The groups did not see one another nor know the identity of the members of the other group. They *were* informed of the status and leadership characteristics of the other group, and were told that the other group was, in all other respects, similar

to itself. Again, this opportunity was utilized to reinforce the group's internalization of its own characteristics. A sign was propped in front of the subjects, denoting the status and leadership characteristics of the other group. On more than one occasion the group members did violence to the sign which indicated that the other group had a higher status (I.Q.) than themselves. It will be recalled that the presumption was made earlier that the groups were similar to one another, except for the experimental variables. It will be seen now that, regardless of the validity of that presumption, the subjects did, in fact, *perceive* it as being true, which was the important thing.

As in the in-group sessions, the groups were given a task of making recommendations regarding a human relations case history. Each group was instructed to attempt to reach agreement with the other group on a recommendation. The experimenter remained out of the rooms during the course of the groups' discussions, and no data were collected on *intra*group interaction. No group used the same case more than once. These cases and the instructions for subjects were the same ones previously used by Bales and Borgatta in their studies of group size (3).

The notes which the groups sent to one another formed the body of data which was studied. These 32 interaction records were scored and analyzed by means of Bales's technique of interaction process analysis (2). The experimenter and an assistant scored each note independently, according to Bales's system, with a very high degree of reliability. One of the 32 interaction records was personally scored by Bales. A comparison, by chi-square, of his scoring with that obtained in this experiment indicates that the two are similar, at approximately the 0.90 significance level. There were two essential ways in which the two scorings differed. Many acts which, in this experiment, were scored in Category 2, were placed in Category 1 by Bales. Also in this experiment, more minute acts were scored, thus yielding a higher total number of acts. The latter occurred especially in Categories 4, 5, and 6. It will be noted that neither of these differences is such as to materially affect the experimental results. There is every indication that the scoring of the experimental data was reliable, and conformed to the Bales system.

As a measure of conflict or hostility between the groups, Bales's Index of Expressive-Malintegrative Behavior was used (2, p. 142). In his twelve-category scheme for analyzing interaction, it will be recalled, the first three categories, namely, "shows solidarity," "shows tension release," and "agrees," are referred to as positive social-emotional reactions. Similarly, the last three categories, namely, "disagrees," "shows tension," and "shows antagonism," are called negative social-emotional reactions. The Index of Expressive-Malintegrative Behavior, or EMB, is the ratio of the number of negative social-emotional acts to the total number of acts in the combined categories

of negative and positive social-emotional acts. This ratio has a possible range of 0 to 100, with a high EMB indicating more expressive-malintegrative behavior, or conflict. The formula for the EMB is as follows:

$$\text{Index of Expressive-Malintegrative Behavior} = \frac{(N_{10} + N_{11} + N_{12}) \times 100}{(N_{10} + N_{11} + N_{12}) + (N_1 + N_2 + N_3)},$$

where the N's refer to the frequencies of acts in the indicated categories.

RESULTS

In the discussion of the results, which follows, it is important to note that no differential treatment was given to any of the groups, except for the protocol used to impart and reinforce the group characteristics. As pointed out above, the 16 groups were presumed to be similar to one another except for the experimental variables. The Latin Square design utilized in the scheduling of interaction sessions compensated for any bias which might have been introduced because of learning, meeting location, or the order of interaction with different types of groups. The external conditions of all experimental sessions were the same, the instructions to the groups were the same, the demeanor of the experimenter and his assistant was, insofar as possible, the same. In fact, the Latin Square design was also used to determine whether the experimenter or the assistant would meet with each group to give the instructions and case materials at each session. In other words, the external environments of all the groups were systematically randomized, and the groups themselves were perceived by the group members to be identical to one another, with the sole exception of the status and leadership dimensions. Since the topic under investigation was *inter*group interaction, no attempt was made to collect data on *intra*group interaction. It was sufficient to investigate the relationship between group characteristics and patterns of intergroup interaction. However, since throughout the whole experiment the only systematic differences between the various groups were with regard to the status and leadership differences, it is apparent that any differences in the results must have been generated from within the groups.

In view of the nature of the Bales categories, most of the social-emotional acts do not lend themselves to meaningful quotation out of context. However, a few examples from the notes written by the various groups will be useful in interpreting the results, and will also indicate the extent of internalization of the group dimensions by the members.

For example, after some difficulty in communication, one high status-emergent leader group sent the following message to a low status-appointed leader group: "What type of sign have you on your table? What type of group are we designated as? We are told that you are a low I.Q. with an appointed leader. We assume nothing. This may be a possible barrier between our communication."

TABLE 2

Index of Expressive-Malintegrative Behavior (Conflict) for the Various Kinds of Interaction Situations, in Order of Increasing Size

Types of Groups in the Interaction Situation	Number of Dimensions in Which the Groups Differed	EMB
high status-appointed leader / high status-appointed leader	0	17.2
low status-emergent leader / low status-emergent leader	0	20.3
low status-appointed leader / low status-appointed leader	0	25.5
high status-emergent leader / high status-emergent leader	0	30.0
high status-emergent leader / low status-emergent leader	1	31.0
low status-appointed leader / low status-emergent leader	1	34.3
high status-appointed leader / low status-appointed leader	1	45.6
high status-emergent leader / low status-appointed leader	2	50.0
high status-appointed leader / high status-emergent leader	1	50.9
high status-appointed leader / low status-emergent leader	2	73.2
	Weighted Means:	38.6

The following message was sent from a low status-emergent leader group to a high status-appointed leader group, in response to a request for suggestions as to how to tackle the problem: "You guys have got the brains . . . what do you suggest???"

A sarcastic comment from a low status-emergent leader group to a high status-appointed leader group: "We realize that your low IQ's put you in a distinct disadvantage but please do try to look at the over-all situation."

A low status-emergent leader group commented to a high status-emergent leader group: "That was a dandy suggestion. . . . The solution seems to be gathering steam."

A high status-emergent leader group to a low status-emergent leader group: "We have a card on our table saying that you are a low IQ group with no leader but your very concise reports seemed to disprove that . . . it has been a pleasure working with you."

On a day when its leader was absent, one high status-appointed leader group wrote to a high status-emergent leader group: "We are sheep without a leader and have no one to settle our conflicts."

The records of interaction between similar combinations of groups were combined and analyzed together. For example, referring again to Table 1, it will be noted that there were four situations in which a high status-emergent leader group interacted with a high status-appointed leader group. These four interaction records were combined. Similiarly, the interaction records for other combinations of characteristics were combined. Table 2 shows the EMB for each of the resulting combinations of groups. The range of EMB's is from 17.2, for the interactions between high status-appointed leader groups with other groups of the same characteristics, to 73.2, for interactions between the high status-appointed leader groups and the low status-emergent leader

TABLE 3

Frequencies of Acts in Bales's Categories, and EMB, for All Interaction Situations, According to the Number of Differences between the Interacting Groups

Number of Differences	Frequencies of Acts in Bales's Categories						EMB*
	1	2	3	10	11	12	
0	6	63	44	20	2	10	22.1
1	28	50	103	51	13	50	38.6
2	0	16	19	25	5	31	63.5
						Kruskal-Wallis H=7.3	
						$\alpha < .01$	

* These values are weighted means of the values in Table 2.

groups. The weighted mean of all the EMB's is 38.6. There is a steady increase in size of EMB as the *number* of differences between the groups increases, with the exception of two which are interchanged (the interactions between the high status-emergent leader groups and the low status-appointed leader groups, and the interactions between the high status-appointed leader groups and the high status-emergent leader groups). Even a cursory glance at this table indicates the existence of a relationship supporting the experimental hypothesis.

To permit a more adequate statistical test of the hypothesis, however, EMB's were computed for a combination of all the interaction situations in which the interacting groups were similar to each other (i.e., had zero differences); for a combination of all the situations in which the interacting groups were similar on one dimension but different on the other; and for a combination of all the situations in which the groups differed along both dimensions. These are shown in Table 3, along with the raw data from which the EMB's were computed. For all the situations in which the two interacting groups were alike in characteristics, the EMB was 22.1. When the two groups dif-

fered along only one dimension, the EMB was 38.6. And when the two interacting groups differed in both status and leadership, the FMB was 63.5. A Kruskal-Wallis one-way analysis of variance by ranks was used to test the significance of the differences in these figures (15). The resulting value of the statistic was 7.3, which is significant at better than the 1 per cent level. Therefore, the values in Table 3 are significantly different from one another, and the experimental hypothesis was accepted. That is, within the limitations of the experiment—the nature of the subjects and groups, the task characteristics of the interaction situations, and the restrictions on the interaction—these results demonstrate that the level of intergroup conflict is directly related to the extent of the differences between the groups.

CONCLUSIONS

Several conclusions may be derived from these results. First, the results lend much support to the validity of part of the experimental design. It will be remembered that the differences between the groups were perceived differences. No data were collected by means of which it would have been possible to test the acceptance of these perceptions by the subjects. These results, however, show beyond reasonable doubt that the desired experimental differences were actually imparted to the several groups. Subjective observations of the subjects' behavior, by the experimenter and assistants, also support this. Thus we have further support, if this be needed, of the importance of perceptions, as differentiated from facts, in the determination of intergroup interaction. The perceptions which one group has of another group may be at great variance from the actual characteristics of the other group, but it is these perceptions which are important in determining the nature of the intergroup interaction.

Secondly, these results are of course consistent with observations of everyday behavior, especially in the practical field of human relations. For example, there is more likely to be hostility between a Methodist church group and a Jewish church group, than there is between two Methodist church groups, other things being equal; and further, there is more likely to be hostility between Methodist and Jewish church groups of different socio-economic classes than there is between Methodist and Jewish groups of the same socio-economic class. These results imply that a reduction in the number of differences between two groups will be accompanied by a decrease in the amount of hostility between the groups.

Newcomb hypothesizes some explanations of intergroup conflict which are applicable to the present data. He attributes such conflict, in part, to the operation of group norms, and the resulting perception of the out-group as threatening (8). The status differences in the present experiment might

certainly manifest themselves as threats to the various groups involved. It may be that the leadership differences were also productive of perceptions of threat in the same manner, although the reasons are more obscure. A probable explanation is that the emergent and appointed leadership situations were perceived by the group members as democratic and authoritarian types of leadership, respectively. If this was so, it is not unreasonable to expect ego-involvement, and therefore expressions of affect, in these situations.

Finally, as mentioned above, the methodological aspects of this research may be, in their own way, as significant as the testing of the hypothesis. Not only has a method been devised for the experimental laboratory study of intergroup interaction, but also the Bales technique of interaction analysis proved useful in this connection. Insofar as is known, this was the first application of this technique to the analysis of interaction *between* groups. The results of the project reported upon in this paper, along with results derived from other portions of the project, are such that there is no reason to believe that the Bales technique is not applicable and productive. Thus it is seen that interpersonal interaction and intergroup interaction are amenable to measurement and analysis by the same method. It may be that this is merely another manifestation of the identical qualities of these two kinds of interaction.

SUMMARY

Most of the literature on intergroup interaction has, in actuality, reported upon relationships between various categories or descriptive classes of people, as, for example, Negroes or white-collar workers. Despite the voluminous works subsumed under "intergroup interaction," few studies of relationships between actual groups, and even fewer experimental studies, exist. In the present research, an experimental laboratory investigation of intergroup interaction between small groups was conducted. The groups varied in status and leadership characteristics. The interaction between groups was analyzed by means of Bales's system. Intergroup hostility was found to vary directly with the number of differences between the groups. It was shown that interaction between groups is capable of laboratory study, as is interpersonal interaction.

Manuscript received: November 18, 1959
Revised Manuscript received: May 9, 1960
Henry L. Manheim
Department of Sociology
Arizona State University
Tempe, Arizona

REFERENCES

1. Avigdor, R., "The Development of Stereotypes as a Result of Group Interaction," doctoral thesis, New York Univesity, 1952.

2. Bales, R. F., *Interaction Process Analysis,* Cambridge, Massachusetts: Addison-Wesley, 1951.
3. Bales, R. F., and E. F. Borgatta, "Size of Group as a Factor in the Interaction Profile," in A. P. Hare, E. F. Borgatta, and R. F. Bales (eds.), *Small Groups,* New York: Knopf, 1955.
4. Carter, L., *et al.,* "The Behavior of Leaders and Other Group Members," *Journal of Abnormal and Social Psychology,* 1951, 46, 589–95.
5. Harvey, O. J., "An Experimental Investigation of Negative and Positive Relationships between Small Informal Groups Through Judgmental Indices," doctoral dissertation, University of Oklahoma, 1954.
6. Kelley, H. H., "Communication in Experimentally Created Hierarchies," *Human Relations,* 1951, 4, 39–56.
7. Kohn, M. L., and R. M. Williams, Jr., "Situational Patterning in Intergroup Relations," *American Sociological Review,* 1956, 21, 164–74.
8. Newcomb, T. M., *Social Psychology,* New York: Dryden, 1950.
9. Otis, A. S., *Otis Quick-Scoring Mental Ability Tests* (New Edition, Gamma Test, Form EM), Yonkers-on-Hudson, New York: World Book Company, 1954.
10. Sherif, M., "Integrating Field Work and Laboratory in Small Group Research," *American Sociological Review,* 1954, 19, 759–71.
11. Sherif, M., "Superordinate Goals in the Reduction of Intergroup Conflict," *American Journal of Sociology,* 1958, 63, 349–56.
12. Sherif, M., and C. W. Sherif, *Groups in Harmony and Tension,* New York: Harper, 1953.
13. Sherif, M., B. J. White, and O. J. Harvey, "Status in Experimentally Produced Groups," *American Journal of Sociology,* 1955, 60, 370–79.
14. Sherif, M., *et al.,* "Experimental Study of Positive and Negative Intergroup Attitudes between Experimentally Produced Groups," (mimeographed), Norman, Oklahoma: University of Oklahoma Intergroup Relations Project, 1954.
15. Siegel, S., *Nonparametric Statistics for the Behavioral Sciences,* New York: McGraw-Hill, 1956.
16. Thibaut, J., "An Experimental Study of the Cohesiveness of Underprivileged Groups," *Human Relations,* 1950, 3, 251–78.
17. Thurstone, L. L., *Thurstone Temperament Schedule* (Form AM), Chicago: Science Research Associates, 1953.
18. Warriner, C. K., "Groups Are Real: A Reaffirmation," *American Sociological Review,* 1956, 21, 549–54.
19. Williams, R. M., Jr., *The Reduction of Intergroup Tensions,* New York: Social Science Research Council Bulletin 57, 1947.